DEPARTMENT OF AGRICULTURE.

# CENTRAL EXPERIMENTAL FARM.

OTTAWA CANADA.

BULLETIN No. 21. – 39

## RESULTS OF EXPERIMENTS WITH EARLY, MEDIUM AND LATE SOWINGS OF GRAIN.

MARCH, 1895.

PUBLISHED BY DIRECTION OF THE HON. A. R. ANGERS, MINISTER OF AGRICULTURE.

To the Honourable
The Minister of Agriculture.

SIR,—I have the honour to submit for your approval Bulletin No. 21 of the Experimental Farm series, which has been prepared by myself, in which are given the results of a number of successive sowings of grain made at intervals of a week during the spring of each year for the past four or five seasons. This work has been undertaken for the purpose of ascertaining the approximate dates when grain can be sown with the greatest profit in different parts of the Dominion.

I trust that the information submitted on this important subject, gathered from carefully conducted experiments at all the Experimental Farms, will be found very useful to farmers everywhere throughout this country.

I have the honour to be
Your obedient servant,

WM. SAUNDERS,
Director Experimental Farms.

OTTAWA, March 12, 1895.

# RESULTS OF EXPERIMENTS

— WITH —

# Early, Medium and Late Sowings of Grain.

BY WM. SAUNDERS, F.R.S.C., F.L.S., F.C.S.,
*Director Experimental Farms.*

In Bulletin No. 8, published in January, 1891, the results were given of experiments which had been conducted in 1890, at the Central Experimental Farm, with early, medium and late sowings of barley, oats and spring wheat. These results indicated a great advantage from early sowing. Similar tests have been carried on each year since, not only at the Central Farm, but also on the branch Experimental Farms, with the object of gaining further information on the subject here, and also for the purpose of ascertaining how far differences of climate and location influence the returns, so that some conclusions might be reached as to the best and most profitable time for seeding in different portions of the Dominion. The experience gained by these experiments since 1891, is deemed of sufficient importance to justify the issue of a second bulletin on this subject.

These experiments have been conducted in every instance with two varieties each of barley, oats and spring wheat, and generally the same varieties have been used at each of the Experimental Farms. Five or six successive sowings have been made each year, the first sowing as soon as the land was in fit condition to receive the seed, and the subsequent sowings a week apart. The results obtained from these tests at the Central Experimental Farm will first be considered.

## RESULTS OF TESTS AT THE CENTRAL EXPERIMENTAL FARM.

Thirty-six plots of $\frac{1}{10}$ acre each have been devoted to these tests, and the same land has been used for five successive seasons, the arrangement of the plots being changed from year to year so that oats and barley have followed wheat; barley and wheat have followed oats, and wheat and oats have followed barley.

### CHARACTER AND TREATMENT OF SOIL.

The soil is a light sandy loam as uniform in character as could be selected. In 1886 when the Experimental Farm was purchased, this land was in sod. A crop of hay was taken from it in 1887 when, finding that it was much exhausted, a coating of stable manure about twenty

tons to the acre was applied to it early in the autumn, and shortly after the manure was ploughed under with the sod. In the spring of 1888, it was again ploughed, then harrowed and sown with wheat and oats in experimental plots. It was ploughed again in the autumn, and in the spring of 1889 it was planted with Indian corn in drills, which was cut in September following for ensilage. Subsequently the land was ploughed again, and early in the spring of 1890 it received a dressing of unleached wood ashes, about 150 bushels to the acre, when the first series of these experimental plots was sown. As the returns of the first harvest were not large, a further dressing of stable manure was given in the spring of 1891, which was lightly ploughed under before seeding. Since that time this land has received no further manuring or fertilizing. The plots have been ploughed each year in the autumn and disc-harrowed in the spring. Immediately before sowing each set of plots, the smoothing harrow has been used so as to destroy any weeds which may have germinated and thus give to each series of plots the same chance at the start as to condition of soil.

## Experiments with Oats.

### 1890—Varieties sown, Prize Cluster and Early Race-horse.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 22, | Prize Cluster | 37 | 2 | Early Race-horse | omitted. | |
| 2nd | do | do 29 | do | 33 | 23 | do do | 35 | 5 |
| 3rd | do | May 6 | do | 30 | 20 | do do | 31 | 26 |
| 4th | do | do 13 | do | 27 | 17 | do do | 28 | 13 |
| 5th | do | do 21 | do | 20 | 10 | do do | 18 | 18 |
| 6th | do | do 28 | do | 17 | 22 | do do | 19 | 4 |

### 1891—Varieties sown, Prize Cluster and Banner.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 21, | Prize Cluster | 59 | 24 | Banner | 76 | 1 |
| 2nd | do | do 28 | do | 84 | 4 | do | 79 | 24 |
| 3rd | do | May 5 | do | 54 | 24 | do | 86 | 26 |
| 4th | do | do 12 | do | 33 | 8 | do | 87 | 22 |
| 5th | do | do 19 | do | 53 | 3 | do | 78 | 18 |
| 6th | do | do 26 | do | 40 | 00 | do | 55 | 30 |

### 1892—Varieties sown, Prize Cluster and Banner.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 20, | Prize Cluster | 64 | 14 | Banner | 73 | 8 |
| 2nd | do | do 27 | do | 56 | 26 | do | 71 | 6 |
| 3rd | do | May 4 | do | 44 | 4 | do | 68 | 8 |
| 4th | do | do 11 | do | 41 | 26 | do | 59 | 24 |
| 5th | do | do 18 | do | 33 | 28 | do | 50 | 00 |
| 6th | do | do 25 | do | 33 | 8 | do | 39 | 24 |

### 1893—Varieties sown, Prize Cluster and Banner.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May | 8, | Prize Cluster | 44 | 24 | Banner | 49 | 29 |
| 2nd | do | do 15 | do | 35 | 20 | do | 38 | 8 |
| 3rd | do | do 22 | do | 11 | 6 | do | 31 | 6 |
| 4th | do | do 29 | do | 15 | 20 | do | 30 | 20 |
| 5th | do | June 5 | do | 6 | 16 | do | 16 | 26 |
| 6th | do | do 12 | do | 5 | 00 | do | 11 | 26 |

1894—Varieties sown, Abundance and Banner.

| | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, April 13, | Abundance | 39 | 14 | Banner | 29 | 24 |
| 2nd do do 20 | do | 34 | 14 | do | 30 | 30 |
| 3rd do do 27 | do | 23 | 18 | do | 23 | 8 |
| 4th do May 4 | do | 19 | 19 | do | 17 | 2 |
| 5th do do 11 | do | 25 | 10 | do | 28 | 8 |
| 6th do do 18 | do | 7 | 22 | do | 6 | 21 |

The average yield per acre each year of all the sowings of all the varieties of oats tested at the Central Experimental Farm was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1890, average of eleven sowings | 27 | $8\frac{4}{11}$ |
| 1891, do twelve do | 65 | $26\frac{2}{3}$ |
| 1892, do do do | 53 | $\frac{1}{2}$ |
| 1893, do do do | 24 | $25\frac{1}{3}$ |
| 1894, do do do | 23 | $27\frac{1}{6}$ |

Average yield of each of the successive sowings of oats, including all the varieties for the whole period of five years.

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of nine tests | 52 | $23\frac{1}{2}$ |
| 2nd do ten | 49 | 33 |
| 3rd do do | 40 | 18 |
| 4th do do | 36 | $3\frac{1}{2}$ |
| 5th do do | 33 | $3\frac{1}{2}$ |
| 6th do do | 23 | $22\frac{1}{2}$ |

In the comparison of the results of these and following tests it will be observed that great variation in the yields occur from year to year. These are due mainly to the favourable or unfavourable character of the season, which is a most important factor bearing on the welfare of the farmer. On comparing the figures given, it will be seen that the year 1891 was the most favourable for oat-growing of the whole series. There was also less uniformity that season in the results of the successive sowings. The crops of 1892 stand next in yield, while 1890, 1893 and 1894 were unfavourable seasons for this grain. The very light yields of Prize Cluster given for the 5th and 6th sowings in 1893 were due to the grain being badly broken down by a severe attack of rust.

## Experiments with Barley.

1890—Varieties sown, Prize Prolific two-rowed and Danish Chevalier two-rowed.

| | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, April 22, | Prize Prolific | 40 | 30 | Danish Chevalier | 33 | 26 |
| 2nd do do 29 | do | 24 | 38 | do do | 22 | 14 |
| 3rd do May 6 | do | 16 | 22 | do do | 19 | 38 |
| 4th do do 13 | do | 14 | 3 | do do | 15 | 10 |
| 5th do do 21 | do | 10 | 15 | do do | 10 | 30 |
| 6th do do 28 | do | 11 | 2 | do do | 9 | 28 |

1891—Varieties sown, Prize Prolific two-rowed and Baxter's six-rowed.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 21, | Prize Prolific | 65 | 10 | Baxter's six-rowed | 55 | 35 |
| 2nd do | do | 28 | do | 55 | 35 | do do | 67 | 4 |
| 3rd do | May | 5 | do | 50 | 20 | do do | 56 | 32 |
| 4th do | do | 12 | do | 51 | 37 | do do | 42 | 39 |
| 5th do | do | 19 | do | 40 | 40 | do do | 34 | 8 |
| 6th do | do | 26 | do | 37 | 14 | do do | 35 | 30 |

1892—Varieties sown, Kinver Chevalier two-rowed and Goldthorpe two-rowed.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 20, | Kinver Chevalier | 42 | 14 | Goldthorpe | 44 | 28 |
| 2nd do | do | 27 | do | 47 | 24 | do | 42 | 41 |
| 3rd do | May | 4 | do | 31 | 12 | do | 37 | 4 |
| 4th do | do | 11 | do | 31 | 12 | do | 29 | 38 |
| 5th do | do | 18 | do | 20 | 35 | do | 22 | 34 |
| 6th do | do | 25 | do | 17 | 14 | do | 16 | 32 |

1893—Varieties sown, Duck-bill two-rowed and Baxter's six-rowed.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May | 8, | Duck-bill | 33 | 36 | Baxter's six-rowed | 32 | 4 |
| 2nd do | do | 15 | do | 35 | 10 | do do | 33 | 26 |
| 3rd do | do | 22 | do | 17 | 34 | do do | 32 | 44 |
| 4th do | do | 29 | do | 25 | 00 | do do | 27 | 4 |
| 5th do | June | 5 | do | 10 | 20 | do do | 26 | 02 |
| 6th do | do | 12 | do | 15 | 30 | do do | 36 | 12 |

1894—Varieties sown, Canadian Thorpe two-rowed and Oderbruch six-rowed.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 13, | Canadian Thorpe | 19 | 4 | Oderbruch | 31 | 2 |
| 2nd do | do | 20 | do do | 23 | 6 | do | 33 | 46 |
| 3rd do | do | 27 | do do | 16 | 22 | do | 26 | 42 |
| 4th do | May | 4 | do do | 10 | 40 | do | 19 | 38 |
| 5th do | do | 11 | do do | 10 | 25 | do | 25 | 30 |
| 6th do | do | 18 | do do | 7 | 14 | do | 13 | 26 |

The average yield per acre each year of all the sowings of all the varieties of barley tested at the Central Experimental Farm was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1890, average of twelve sowings | 19 | $1\frac{1}{3}$ |
| 1891, do do | 49 | $21\frac{1}{3}$ |
| 1892, do do | 32 | .. |
| 1893, do do | 27 | $6\frac{1}{2}$ |
| 1894, do do | 19 | $37\frac{1}{4}$ |

Average yield of each of the successive sowings of barley, including all the varieties for the whole period of five years:—

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of ten tests | 39 | $38\frac{1}{10}$ |
| 2nd do do | 38 | $29\frac{2}{10}$ |
| 3rd do do | 30 | 27 |
| 4th do do | 26 | $36\frac{1}{2}$ |
| 5th do do | 21 | $9\frac{1}{2}$ |
| 6th do do | 20 | 1 |

In the case of the barley also, the season of 1891 was the most favourable, followed by 1892 and 1893. The seasons of 1894 and 1890 were not favourable. In 1891 the results of the 2nd and 3rd sowings of Baxter's barley exceeded that of the 1st sowing, while the 6th sowing yielded a little more than the 5th. In 1892 the crop of Kinver Chevalier was larger from the 2nd than it was from the 1st sowing. In 1893 and 1894 both varieties gave the largest yield from the 2nd sowings, and in 1893 the Duck-bill gave a larger return from the 4th than it did from the 3rd sowing, and larger from the 6th than from the 5th. In 1894 the Oderbruch gave a better yield from the 5th than it did from the 4th sowing. All these irregularities, however, disappear when the average of the whole series is taken, then the losses from late sowing are clearly shown.

## Experiments with Spring Wheat.

### 1890—Varieties sown, Red Fife and Ladoga.

| | | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, | April | 22, | Red Fife | 11 00 | Ladoga | 10 45 |
| 2nd do | do | 29 | do | 9 00 | do | 9 15 |
| 3rd do | May | 6 | do | 8 15 | do | 8 00 |
| 4th do | do | 13 | do | 4 20 | do | 3 55 |
| 5th do | do | 21 | do | 3 00 | do | 2 50 |
| 6th do | do | 28 | do | 2 35 | do | 2 30 |

### 1891—Varieties sown, Campbell's White Chaff and White Connell.

| | | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, | April | 21, | Campbell's White Chaff | 47 50 | White Connell | 35 50 |
| 2nd do | do | 28 | do do | 32 50 | do | 26 40 |
| 3rd do | May | 5 | do do | 27 30 | do | 30 00 |
| 4th do | do | 12 | do do | 29 30 | do | 23 20 |
| 5th do | do | 19 | do do | 28 30 | do | 23 40 |
| 6th do | do | 26 | do do | 19 10 | do | 27 10 |

### 1892—Varieties sown, Campbell's White Chaff and Red Fife.

| | | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, | April | 20, | Campbell's White Chaff | 27 20 | Red Fife | 20 20 |
| 2nd do | do | 27 | do do | 25 00 | do | 28 30 |
| 3rd do | May | 4 | do do | 16 50 | do | 20 30 |
| 4th do | do | 11 | do do | 13 30 | do | 12 30 |
| 5th do | do | 18 | do do | 7 20 | do | 10 30 |
| 6th do | do | 25 | do do | 8 10 | do | 6 40 |

### 1893—Varieties sown, Campbell's White Chaff and Red Fife.

| | | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, | May | 8, | Campbell's White Chaff | 12 15 | Red Fife | 8 50 |
| 2nd do | do | 15 | do do | 18 10 | do | 19 10 |
| 3rd do | do | 22 | do do | 5 20 | do | 6 20 |
| 4th do | do | 29 | do do | 10 00 | do | 5 30 |
| 5th do | June | 5 | do do | 7 50 | do | 12 30 |
| 6th do | do | 12 | do do | 5 50 | do | 9 35 |

### 1894—Varieties sown, Stanley and Red Fife.

| | | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, | April | 13, | Stanley | 12 28 | Red Fife | 15 50 |
| 2nd do | do | 20 | do | 12 40 | do | 15 20 |
| 3rd do | do | 27 | do | 7 5 | do | 7 20 |
| 4th do | May | 4 | do | 6 55 | do | 7 5 |
| 5th do | do | 11 | do | 5 25 | do | 5 40 |
| 6th do | do | 18 | do | 4 55 | do | 2 50 |

The average yield per acre each year of the sowings of all the varieties of wheat tested at the Central Experimental Farm was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1890, average of twelve sowings.......... | 6 | $17\frac{1}{2}$ |
| 1891, do do .......... | 29 | 20 |
| 1892, do do .......... | 16 | $25\frac{10}{12}$ |
| 1893, do do .......... | 10 | 5 |
| 1694, do do .......... | 8 | $37\frac{9}{12}$ |

Average yield per acre of each of the successive sowings of spring wheat, including all the varieties for the whole period of five years :—

| | | |
|---|---|---|
| 1st sowing, ten tests.................... | 20 | $14\frac{8}{10}$ |
| 2nd do do .................... | 19 | $39\frac{1}{2}$ |
| 3rd do do .................... | 13 | 43 |
| 4th do do .................... | 11 | $39\frac{1}{2}$ |
| 5th do do .................... | 10 | $43\frac{1}{2}$ |
| 6th do do .................... | 8 | $56\frac{1}{2}$ |

The season of 1891 was quite favourable to wheat production, the crop from these experimental plots that year being nearly double that of the best of any of the other years. Fair crops were produced in 1892, but 1890 and 1894 were very unfavourable years for this grain. The yields from the several successive sowings show much irregularity some years, but the average returns of the series point strongly to the advantages of early sowing.

## Summary of Results for the Whole Period.

The following are the averages for the whole of the tests of all the varieties for the five years during which they have been carried on at the Central Experimental Farm.

| Oats. | Yield per acre. Bush. Lbs. | Barley. | Yield per acre. Bush. Lbs. | Spring Wheat. | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing....... | 52 $23\frac{1}{2}$ | 1st sowing...... | 39 $38\frac{1}{10}$ | 1st sowing...... | 20 $14\frac{8}{10}$ |
| 2nd do ....... | 49 33 | 2nd do ...... | 38 $29\frac{2}{10}$ | 2nd do ...... | 19 $39\frac{1}{2}$ |
| 3rd do ....... | 40 18 | 3rd do ...... | 30 27 | 3rd do ...... | 13 43 |
| 4th do ...... | 36 $3\frac{1}{2}$ | 4th do ...... | 26 $36\frac{1}{2}$ | 4th do ...... | 11 $39\frac{1}{2}$ |
| 5th do ....... | 33 $3\frac{1}{2}$ | 5th do ...... | 21 $9\frac{1}{2}$ | 5th do ...... | 10 $43\frac{1}{2}$ |
| 6th do ....... | 23 $22\frac{1}{2}$ | 6th do ...... | 20 1 | 6th do ...... | 8 $56\frac{1}{2}$ |

The average crop of each of the different sorts of grain is also submitted, covering all the sowings of all the varieties for the whole period as follows :

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| Oats, 59 sowings........................ | 39 | 4 |
| Barley, 60 sowings...................... | 29 | 23 |
| Spring Wheat, 60 sowings ............... | 14 | $9\frac{1}{2}$ |

## Comparison of Yields of Varieties of Oats.

The question of varieties will next claim our attention.

In the tests conducted at the Central Expermental Farm the different varieties of oats have yielded, per acre, as follows :—

### PRIZE CLUSTER, FOUR YEARS' TESTS, 24 SOWINGS.

| | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Average for 4 yrs. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1890, | 37 | 2 | 1891, | 59 | 24 | 1892, | 64 | 14 | 1893, | 44 | 24 | 51 | 16 |
| 2nd do | " | 33 | 23 | " | 84 | 4 | " | 56 | 26 | " | 35 | 20 | 52 | $18\frac{1}{4}$ |
| 3rd do | " | 30 | 20 | " | 54 | 24 | " | 44 | 4 | " | 11 | 6 | 35 | $5\frac{1}{2}$ |
| 4th do | " | 27 | 17 | " | 33 | 8 | " | 41 | 26 | " | 15 | 20 | 29 | $17\frac{3}{4}$ |
| 5th do | " | 20 | 10 | " | 53 | 3 | " | 33 | 28 | " | 6 | 16 | 28 | $14\frac{1}{2}$ |
| 6th do | " | 17 | 22 | " | 40 | 00 | " | 33 | 8 | " | 5 | 00 | 23 | 33 |

| | Bush. | Lbs. |
|---|---|---|
| 1890, average of six sowings.............. | 27 | 27 |
| 1891, do do .............. | 54 | $4\frac{4}{6}$ |
| 1892, do do .............. | 45 | $23\frac{2}{6}$ |
| 1893, do do .............. | 19 | $25\frac{2}{3}$ |

Average yield for the whole period : 36 bushels, $28\frac{3}{4}$ lbs. per acre.

### BANNER, FOUR YEARS' TESTS, 24 SOWINGS.

| | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Average for 4 yrs. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 76 | 1 | 1892, | 73 | 8 | 1893, | 49 | 29 | 1894, | 29 | 24 | 57 | 7 |
| 2nd do | " | 79 | 24 | " | 71 | 6 | " | 38 | 8 | " | 30 | 30 | 55 | 00 |
| 3rd do | " | 86 | 26 | " | 68 | 8 | " | 31 | 26 | " | 23 | 8 | 52 | 17 |
| 4th do | " | 87 | 22 | " | 59 | 24 | " | 30 | 20 | " | 17 | 2 | 48 | $25\frac{1}{2}$ |
| 5th do | " | 78 | 18 | " | 50 | 00 | " | 16 | 26 | " | 28 | 8 | 43 | 13 |
| 6th do | " | 55 | 30 | " | 39 | 24 | " | 11 | 26 | " | 6 | 21 | 28 | $17\frac{3}{4}$ |

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings.............. | 77 | $14\frac{3}{6}$ |
| 1892, do do .............. | 60 | $11\frac{4}{6}$ |
| 1893, do do .............. | 29 | $28\frac{1}{6}$ |
| 1894, do do .............. | 22 | $21\frac{1}{6}$ |

Average yield for the whole period, 47 bushels, $18\frac{1}{24}$ lbs. per acre.

### Early Race-horse, one year's test.

| | Bush. | Lbs. |
|---|---|---|
| Average of five sowings in 1890.............. | 26 | 20 |

### Abundance, one year's test.

| | Bush. | Lbs. |
|---|---|---|
| Average of six sowings in 1894.............. | 24 | $33\frac{1}{6}$ |

In the very favourable year of 1891 the Prize Cluster averaged 54 bushels $4\frac{4}{6}$ lbs. per acre, covering the whole series of six sowings ; the second sowing giving 84 bushels 4 lbs. per acre. The Banner the same year gave an average of 77 bushels $14\frac{3}{6}$ lbs. per acre ; the fourth sowing giving the highest yield, 87 bush. 22 lbs. per acre. During the unfavourable season of 1894 the yield of Banner dropped to an average of 22 bush. $21\frac{1}{6}$ lbs. for the six sowings, while the Abundance which has only been tried in these tests one year, gave an average of 24 bush. $33\frac{1}{6}$ lbs. While the Banner during the four seasons has given an average yield in all the tests of 10 bushels $24\frac{1}{4}$ lbs. more than the Prize Prolific, it is possible that the Abundance in future may do quite as well, seeing it has exceeded in yield the six sowings of Banner in 1894 by 2 bush. 12 lbs. per acre.

## Comparison of Yields of Varieties of Barley.

In the tests conducted at the Central Experimental Farm the different varieties of barley have yielded as follows :—

*(Two-rowed sorts.)*

PRIZE PROLIFIC, TWO YEARS' TESTS, 12 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | Average for the two years. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1890, | 40 30 | 1891, | 65 10 | 52 44 |
| 2nd do | " | 24 38 | " | 55 35 | 40 12½ |
| 3rd do | " | 16 22 | " | 50 20 | 33 21 |
| 4th do | " | 14 3 | " | 51 37 | 32 44 |
| 5th do | " | 10 15 | " | 40 40 | 25 27½ |
| 6th do | " | 11 2 | " | 37 14 | 24 8 |

The average yields of this barley for each year was as follows :—

| | Yield per acre. Bush. Lbs. |
|---|---|
| 1890, average of six sowings.......... | 19 26⅔ |
| 1891, do do .......... | 50 10 |
| Average yield for the two years......... | 34 42⅙ |

The other two-rowed varieties have each been sown for one year only.

| | Yield per acre. Bush. Lbs. |
|---|---|
| 1890, Danish Chevalier, average of six-sowings..... | 18 24⅖ |
| 1892, Kinver Chevalier, do do ..... | 31 34$\frac{3}{6}$ |
| 1892, Goldthorpe, do do ..... | 32 13$\frac{3}{6}$ |
| 1893, Duckbill, do do ..... | 22 45$\frac{4}{6}$ |
| 1894, Canadian Thorpe, do do ..... | 14 26$\frac{3}{6}$ |

The average yield of two-rowed barley for the whole period including all the varieties and all the sowings, 42 in all, extending over a period of five years, was 27 bushels 5⅓ lbs. per acre.

## Six-rowed Barley.

BAXTER'S SIX-ROWED, TWO YEARS' TESTS, 12 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | Average of two years. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1891, | 55 35 | 1893, | 32 4 | 43 43½ |
| 2nd do | " | 67 4 | " | 33 26 | 50 15 |
| 3rd do | " | 56 32 | " | 32 44 | 44 38 |
| 4th do | " | 42 39 | " | 27 4 | 34 45½ |
| 5th do | " | 34 8 | " | 26 2 | 30 5 |
| 6th do | " | 35 30 | " | 36 12 | 35 45 |

The average yield for each year was as follows :—

| | Yield per acre. Bush. Lbs. |
|---|---|
| 1891, average of six-sowings ... ....... | 48 24 |
| 1893, do do ........... | 31 31$\frac{2}{6}$ |
| Average yield for the two years......... | 40 3$\frac{4}{6}$ |

The other six-rowed variety used in these tests, Oderbruch, has been sown for one year only, 1894 ; the detailed results of these sowings have already been given ; the average of the six sowings was 24 bushels 46 lbs. per acre.

The average yield of the six-rowed barley for the three years, 18 sowings in all, was 35 bushels $3\frac{1}{2}$ lbs. per acre, an advantage of 7 bushels 46 lbs. in favour of the six-rowed sorts tested in these week-apart sowings as compared with the two-rowed.

## Comparison of Yields of Varieties of Wheat.

In the tests conducted at the Central Experimental Farm the different varietes of wheat have yielded per acre as follows :—

RED FIFE, FOUR YEARS' TESTS, 24 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | | Bush. Lbs. | | Bush. Lbs. | Average for four years. Bush. Lbs. |
|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1890, | 11 00 | 1892, | 20 20 | 1893, | 8 50 | 1894, | 15 50 | 14 00 |
| 2nd do | " | 9 00 | " | 28 30 | " | 19 10 | " | 15 20 | 18 00 |
| 3rd do | " | 8 15 | " | 20 30 | " | 6 20 | " | 7 20 | 10 $36\frac{1}{4}$ |
| 4th do | " | 4 20 | " | 12 30 | " | 5 30 | " | 7 5 | 7 $21\frac{1}{4}$ |
| 5th do | " | 3 00 | " | 10 30 | " | 12 30 | " | 5 40 | 7 55 |
| 6th do | " | 2 35 | " | 6 40 | " | 9 35 | " | 2 50 | 5 25 |

The average yield of this wheat for each year was as follows :—

| | | | | |
|---|---|---|---|---|
| 1890, | average of six | sowings | ........... | 6 $21\frac{4}{6}$ |
| 1892, | do | do | ........... | 16 30 |
| 1893, | do | do | ........... | 10 $10\frac{1}{6}$ |
| 1894, | do | do | ........... | 9 $\frac{5}{6}$ |

Average yield of Red Fife for the whole period, 10 bushels 31 lbs. per acre.

CAMPBELL'S WHITE CHAFF, THREE YEARS' TESTS, 18 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | | Bush. Lbs. | Average for three years. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 47 50 | 1892, | 27 20 | 1893, | 12 15 | 29 $8\frac{2}{3}$ |
| 2nd do | " | 32 50 | " | 25 00 | " | 18 10 | 25 20 |
| 3rd do | " | 27 30 | " | 16 50 | " | 5 20 | 16 $33\frac{1}{3}$ |
| 4th do | " | 29 30 | " | 13 30 | " | 10 00 | 17 40 |
| 5th do | " | 28 30 | " | 7 20 | " | 7 50 | 14 $33\frac{1}{3}$ |
| 6th do | " | 19 10 | " | 8 10 | " | 5 50 | 11 $3\frac{1}{3}$ |

The average yield of this wheat for each year was as follows :—

| | | | | Bush. Lbs. |
|---|---|---|---|---|
| 1891, | average of six | sowings | ............ | 30 $53\frac{2}{6}$ |
| 1892, | do | do | ............ | 16 $21\frac{4}{6}$ |
| 1893, | do | do | ............ | 9 $54\frac{1}{6}$ |

Average yield for the three years...............19 3 per acre.

The other varieties of wheat used in these tests were Ladoga and Stanley, both used for one year only and both in very unfavourable seasons. Ladoga was sown in 1890, when it gave an average for all sowings of 6 bushels $12\frac{1}{2}$ lbs. per acre. Red Fife gave the same year an average of 6 bushels $21\frac{4}{6}$ lbs. Stanley, which is one of the new cross-bred varieties between Ladoga and Red Fife produced at the Experimental Farm, was tried in 1894 and gave an average yield for all sowings of 8 bushels $14\frac{4}{6}$ lbs. per acre. Red Fife, the same year, yielded an average of 9 bushels $\frac{5}{6}$ lbs., and White Connell, in 1891, which was a favourable season, gave an average of 27 bushels $46\frac{4}{6}$ lbs per acre.

We shall next consider the results obtained by similar tests at the several branch Experimental Farms.

## RESULTS OF TESTS AT THE EXPERIMENTAL FARM, NAPPAN, NOVA SCOTIA.

At all the branch farms the location of these plots for week-apart sowings has been changed from year to year, and the preparation of the soil has been the same as that for ordinary crops.

### Experiments with Oats.

1891—Varieties sown, Prize Cluster and Banner.

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 30 | Prize Cluster | 52 | 32 | Banner | 72 | 2 |
| 2nd do | May 7 | do | 45 | 10 | do | 83 | 3 |
| 3rd do | do 14 | do | 54 | 14 | do | 84 | 31 |
| 4th do | do 21 | do | 61 | 26 | do | 55 | 20 |
| 5th do | do 29 | do | 49 | 14 | do | 61 | 21 |
| 6th do | June 5 | do | 30 | 30 | do | 46 | 26 |

1882—Varieties sown, Prize Cluster and Banner.

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acrs. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 27 | Prize Cluster | 37 | 17 | Banner | 67 | 17 |
| 2nd do | May 4 | do | 45 | 00 | do | 67 | 17 |
| 3rd do | do 11 | do | 42 | 17 | do | 75 | 00 |
| 4th do | do 18 | do | 40 | 00 | do | 55 | 00 |
| 5th do | do 25 | do | 38 | 00 | do | 32 | 00 |
| 6th do | June 1 | do | 34 | 00 | do | 30 | 00 |

1893—Varieties sown, Prize Cluster and Banner.

(In this instance the records are incomplete, only four sowings having been made.)

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | May 10 | Prize Cluster | 37 | 14 | Banner | 55 | 00 |
| 2nd do | do 17 | do | 32 | 14 | do | 55 | 00 |
| 3rd do | do 24 | do | 32 | 14 | do | 50 | 00 |
| 4th do | do 31 | do | 25 | 00 | do | 30 | 00 |

1894—Varieties sown, Prize Cluster and Banner.

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing | May 9 | Prize Cluster | 32 | 12 | Banner | 42 | 12 |
| 2nd do | do 16 | do | 26 | 24 | do | 38 | 8 |
| 3rd do | do 23 | do | 25 | 10 | do | 32 | 12 |
| 4th do | do 30 | do | 32 | 32 | do | 31 | 26 |
| 5th do | June 6 | do | 24 | 24 | do | 31 | 6 |
| 6th do | do 13 | do | 22 | 32 | do | 20 | 00 |

The average yield per acre each year of all the sowings of all the varieties of oats tested at the Experimental Farm, Nappan, N.S., was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of twelve sowings | 58 | $7\frac{3}{4}$ |
| 1892, do do | 47 | 00 |
| 1893, do eight do | 39 | $22\frac{1}{4}$ |
| 1894, do twelve do | 30 | $2\frac{1}{3}$ |

Average yield per acre of each of the successive sowings of oats, including all the varieties for the whole period of four years.

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of eight tests | 49 | $21\frac{3}{4}$ |
| 2nd do do | 49 | $5\frac{1}{4}$ |
| 3rd do do | 49 | $20\frac{3}{4}$ |
| 4th do do | 41 | $17\frac{1}{4}$ |
| 5th do six do | 39 | $16\frac{1}{2}$ |
| 6th do do | 30 | 26 |

The results of these experiments at Nappan, N.S., show practically no variation between the first three sowings, but there is a considerable average reduction from week to week afterwards. The season of 1891 was the most favourable of the series here also, that of 1894 gave the smallest yields.

## Experiments with Barley.

1891—Varieties sown, Prize Prolific two-rowed and Baxter's six-rowed.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 30, | Prize Prolific...... | 45 | 45 | Baxter's six-rowed... ...... | 41 | 32 |
| 2nd do | May 7 | do ...... | 50 | 25 | do do ......... | 42 | 44 |
| 3rd do | do 14 | do ...... | 41 | 32 | do do ......... | 39 | 8 |
| 4th do | do 21 | do ...... | 35 | 45 | do do ......... | 38 | 26 |
| 5th do | do 29 | do ...... | 31 | 42 | do do ......... | 32 | 39 |
| 6th do | June 5 | do ...... | 34 | 8 | do do ......... | 29 | 38 |

1892—Varieties sown, Prize Prolific two-rowed and Baxter's six-rowed.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 27, | Prize Prolific...... | 35 | 00 | Baxter's six-rowed......... | 42 | 24 |
| 2nd do | May 4 | do ...... | 47 | 24 | do do ......... | 42 | 24 |
| 3rd do | do 11 | do ...... | 42 | 24 | do do ......... | 55 | 00 |
| 4th do | do 18 | do ...... | 50 | 00 | do do ......... | 40 | 00 |
| 5th do | do 25 | do ...... | 32 | 24 | do do ......... | 35 | 00 |
| 6th do | June 1 | do ...... | 25 | 00 | do do ......... | 30 | 00 |

1893—Varieties sown, Duck-bill two-rowed and Baxter's six-rowed.

[In this instance the records are incomplete only four sowings having been made.]

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | May 10, | Duck-bill.............. | 30 | 00 | Baxter's six-rowed......... | 32 | 24 |
| 2nd do | do 17 | do .............. | 27 | 24 | do do ......... | 17 | 24 |
| 3rd do | do 24 | do .............. | 32 | 24 | do do ......... | 27 | 24 |
| 4th do | do 31 | do .............. | 7 | 24 | do do ......... | 10 | 00 |

1894—Varieties sown, Duck-bill two-rowed and Baxter's six-rowed.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | May 9, | Duck-bill.............. | 23 | 15 | Baxter's six-rowed......... | 18 | 16 |
| 2nd do | do 16 | do .............. | 17 | 24 | do do ......... | 16 | 12 |
| 3rd do | do 23 | do .............. | 16 | 32 | do do ......... | 15 | 20 |
| 4th do | do 30 | do .............. | 19 | 8 | do do ......... | 19 | 28 |
| 5th do | June 6 | do .............. | 15 | 20 | do do ......... | 14 | 28 |
| 6th do | do 13 | do .............. | 10 | 00 | do do ......... | 12 | 44 |

The average yield per acre each year of all the sowings of all the varieties of barley tested at the Experimental Farm, Nappan, N.S., was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of twelve sowings.......... | 38 | 36 |
| 1892, do do .......... | 39 | 38 |
| 1893, do eight do .......... | 23 | 6 |
| 1894, do twelve do .......... | 16 | $28\frac{5}{12}$ |

Average yield per acre of each of the successive sowings of barley, including all the varieties for the whole period of four years :—

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of eight tests......... | 33 | $31\frac{5}{8}$ |
| 2nd do do do ........ | 32 | $34\frac{5}{8}$ |
| 3rd do do do ........ | 33 | $38\frac{1}{2}$ |
| 4th do do do ........ | 27 | $23\frac{3}{8}$ |
| 5th do do six do ........ | 27 | $1\frac{1}{3}$ |
| 6th do do do ........ | 23 | 31 |

The above figures show that the average yield of the barley plots

was higher at Nappan in 1892 than in 1891, although these may both be regarded as favourable years for barley production in the Maritime Provinces. There was a considerable falling off in the yield in 1893, but the year 1894 was the most unfavourable for this grain.

In the week-apart sowings there was some irregularity in the results, especially in some years. The average crops from the first three sowings did not vary much, but the 3rd sowing gave a slightly larger yield than the 2nd or the 1st. It will be observed that there was a considerable falling off in the later sowings.

## Experiments with Spring Wheat.

1891—Varieties sown, Campbell's White Chaff and White Connell.

| | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 30, | Campbell's White Chaff. | 29 30 | White Connell | 28 30 |
| 2nd do | May 7 | do do | 34 00 | do | 32 40 |
| 3rd do | do 14 | do do | 34 35 | do | 28 30 |
| 4th do | do 21 | do do | 32 40 | do | 33 15 |
| 5th do | do 29 | do do | 32 40 | do | 31 52 |
| 6th do | June 6 | do do | 26 00 | do | 27 5 |

1892—Varieties sown, Campbell's White Chaff and Pringle's Champlain.

| | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 27, | Campbell's White Chaff. | 22 30 | Pringle's Champlain | 30 00 |
| 2nd do | May 4 | do do | 20 00 | do do | 27 30 |
| 3rd do | do 11 | do do | 17 30 | do do | 22 30 |
| 4th do | do 18 | do do | 12 30 | do do | 12 30 |
| 5th do | do 25 | do do | 22 30 | do do | 17 30 |
| 6th do | June 1 | do do | 10 00 | do do | 10 00 |

1893—Varieties sown, Campbell's White Chaff and Red Fife.

[In this instance the records are incomplete only four sowings having been made.]

| | | | Yield per acre. Bush. Lbs. | | Yield per acro. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | May 10, | Campbell's White Chaff | 17 30 | Red Fife | 17 30 |
| 2nd do | do 17 | do do | 20 00 | do | 17 30 |
| 3rd do | do 24 | do do | 20 00 | do | 17 30 |
| 4th do | do 31 | do do | 7 30 | do | 5 00 |

1894—Varieties sown, Stanley and Red Fife.

| | | | Yield per acre. Lush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | May 9, | Stanley | 15 40 | Red Fife | 16 40 |
| 2nd do | do 16 | do | 21 20 | do | 16 30 |
| 3rd do | do 23 | do | 14 40 | do | 15 20 |
| 4th do | do 30 | do | 18 40 | do | 10 20 |
| 5th do | June 6 | do | 15 20 | do | 11 40 |
| 6th do | do 13 | do | did not ripen | do | did not ripen |

The average yield per acre each year of all the sowings of all the varieties of spring wheat tested at the Experimental Farm Nappan, N.S., was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of twelve sowings | 30 | $56\frac{5}{12}$ |
| 1892, do do | 18 | 45 |
| 1893, do eight do | 15 | $18\frac{3}{4}$ |
| 1894, do ten do | 15 | 37 |

Average yield per acre of each of the successive sowings of spring wheat, including all the varieties for the whole period of four years.

| | | | | Bush. | Lbs. |
|---|---|---|---|---|---|
| 1st sowing, average of | | eight tests | ......... | 22 | $13\frac{3}{4}$ |
| 2nd do | do | | do ......... | 23 | $21\frac{1}{4}$ |
| 3rd do | do | | do ......... | 21 | $19\frac{3}{8}$ |
| 4th do | do | | do ......... | 16 | $33\frac{2}{3}$ |
| 5th do | do | six | do ......... | 20 | $15\frac{1}{3}$ |
| 6th do | do | four | do ......... | 18 | $16\frac{1}{4}$ |

In this instance the year 1891 stands out as remarkably favourable for wheat growing in the Maritime Provinces. There was a great falling off in the yield for 1892, and still greater in 1893 and 1894.

The succcessive sowings yielded very irregularly, especially in 1891, when the 1st and 5th sowings of Campbell's White Chaff wheat gave the lowest yields and the 3rd sowing the highest. In the White Connell the same year the results were somewhat similar, the 4th sowing giving the highest yield, the 2nd and 5th standing next, with the 1st and 3rd lower. Irregularities less marked occurred also in the yields of the other years. The average yield of the 2nd sowing was the largest, and the 4th was less than the 5th and 6th.

SUMMARY OF RESULTS FOR THE WHOLE PERIOD.

The following are the averages for the whole of the tests of all the varieties for the four years during which they have been carried on at the Experimental Farm at Nappan, Nova Scotia.

| Oats. | Yield per acre. | | Barley. | Yield per acre. | | Spring Wheat. | Yield per acre. | |
|---|---|---|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. |
| 1st sowing....... | 49 | $21\frac{6}{8}$ | 1st sowing...... | 33 | $31\frac{5}{8}$ | 1st sowing...... | 22 | $13\frac{6}{8}$ |
| 2nd do ....... | 49 | $5\frac{2}{8}$ | 2nd do ...... | 32 | $34\frac{5}{8}$ | 2nd do ...... | 23 | $41\frac{2}{8}$ |
| 3rd do ....... | 49 | $20\frac{6}{8}$ | 3rd do ...... | 33 | $38\frac{4}{8}$ | 3rd do ...... | 21 | $19\frac{3}{8}$ |
| 4th do ....... | 41 | $17\frac{2}{8}$ | 4th do ...... | 27 | $23\frac{3}{8}$ | 4th do ...... | 16 | $33\frac{1}{8}$ |
| 5th do ....... | 39 | $16\frac{1}{2}$ | 5th do ...... | 27 | $1\frac{3}{6}$ | 5th do ...... | 20 | $15\frac{2}{6}$ |
| 6th do ....... | 30 | 26 | 6th do ...... | 23 | 31 | 6th do ...... | 18 | $16\frac{1}{4}$ |

The average crop of each of the different sorts of grain is also submitted, covering all the sowings of all the varieties for the whole period as follows:—

| | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|
| Oats | (44 sowings)................ | 43 | $12\frac{1}{3}$ |
| Barley | (44 do )................ | 30 | $7\frac{2}{11}$ |
| Spring Wheat | (42 do )................ | 21 | 3 |

Taking into account all the results obtained, it would appear that, while the loss from late seeding in the Maritime Provinces would be great, it is not so large as it would be in Ontario and Quebec, and that any time within two weeks from the opening of the season is a good time to sow. It will also be seen that the average yields of all the varieties of grain have been somewhat larger at Nappan than those obtained at the Central Experimental Farm.

## Comparison of Yields of Varieties of Oats.

The different varieties of oats grown at the Experimental Farm at Nappan, N.S., in these week-apart sowings have yielded per acre as follows :—

PRIZE CLUSTER, FOUR YEARS' TESTS, 22 SOWINGS.

| | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Average. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1891, 52 32 | 1892, 37 17 | 1893, 37 14 | 1894, 32 12 | 40 1¾ |
| 2nd do | " 45 10 | " 45 00 | " 32 14 | " 26 24 | 37 12 |
| 3rd do | " 54 14 | " 42 17 | " 32 14 | " 25 10 | 38 22¼ |
| 4th do | " 61 26 | " 40 00 | " 25 00 | " 32 32 | 39 31½ |
| 5th do | " 49 14 | " 38 00 | " omitted | " 24 24 | 37 12⅔ |
| 6th do | " 30 30 | " 34 00 | " omitted | " 22 32 | 29 9⅓ |

The average yield per acre of this variety for each year was as follows :—

| | Bush. Lbs. |
|---|---|
| 1891, average of six sowings.............. | 49 4 |
| 1892, do six do .............. | 39 17 |
| 1893, do four do .............. | 31 25 |
| 1894, do six do .............. | 27 16 |
| Average yield for the four years............ | 36 32½ |

BANNER, FOUR YEARS' TESTS, 22 SOWINGS.

| | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Average. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1891, 72 2 | 1892, 67 17 | 1893, 55 00 | 1894, 42 12 | 59 7¾ |
| 2nd do | " 83 3 | " 67 17 | " 55 00 | " 38 8 | 60 32½ |
| 3rd do | " 84 31 | " 75 00 | " 50 00 | " 32 12 | 60 19¼ |
| 4th do | " 55 20 | " 55 00 | " 30 00 | " 31 26 | 43 3 |
| 5th do | " 61 21 | " 32 00 | " omitted | " 31 6 | 41 20⅓ |
| 6th do | " 46 26 | " 30 00 | " omitted | " 20 00 | 32 8⅔ |

The average yield per acre of the Banner oats in each year was as follows :—

| | Bush. Lbs. |
|---|---|
| 1891, average of six sowings.............. | 67 11$\frac{3}{6}$ |
| 1892, do six do .............. | 54 17 |
| 1893, do four do .............. | 47 17 |
| 1894, do six do .............. | 32 22 |
| Average yield for the four years.......... | 50 16¾ |

It will be seen that the Banner in these tests at Nappan, N. S., has proven a more prolific variety than the Prize Cluster, having exceeded the latter in average yield by 13 bush. 18½ lbs. per acre.

## Comparison of Yields of Varieties of Barley.

In the tests conducted at the Experimental Farm, Nappan, N.S., the different varieties of barley have yielded per acre as follows :—

*(Two-rowed sorts.)*

PRIZE PROLIFIC, TWO YEARS' TESTS, 12 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | Average yield for 2 yrs. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1891, | 45 45 | 1892, | 35 00 | 40 22½ |
| 2nd do | " | 50 25 | " | 47 24 | 49 ½ |
| 3rd do | " | 41 32 | " | 42 24 | 42 4 |
| 4th do | " | 35 45 | " | 50 00 | 42 46½ |
| 5th do | " | 31 42 | " | 32 24 | 32 9 |
| 6th do | " | 34 08 | " | 25 00 | 29 28 |

The average yield per acre of this barley for the two years' sowings was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings........... | 40 | $\frac{5}{6}$ |
| 1892, do do ........... | 38 | 36 |
| Average for the two seasons........... | 39 | $18\frac{1}{3}$ |

DUCK-BILL, TWO YEARS' TESTS.

| | | Bush. | Lbs. | | Bush. | Lbs. | Average. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1893, | 30 | 00 | 1894, | 23 | 16 | 26 | 32 |
| 2nd do | " | 27 | 24 | " | 17 | 24 | 22 | 24 |
| 3rd do | " | 32 | 24 | " | 16 | 32 | 24 | 28 |
| 4th do | " | 7 | 24 | " | 19 | 8 | 13 | 16 |
| 5th do | " | omitted | | " | 15 | 20 | 15 | 20 |
| 6th do | " | omitted | | " | 10 | 00 | 10 | 00 |

The average yield per acre each year of Duck-bill was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1893, average of four sowings........... | 24 | 18 |
| 1894, do six do ........... | 17 | $\frac{2}{3}$ |
| Average for the two seasons........... | 19 | 46 |

Putting the results of the growth of these two varieties together, we find that the average yield of the two-rowed barleys used in all these week-apart tests at Nappan has been 30 bushels $26\frac{6}{11}$ lbs.

### Six-rowed sorts.

BAXTER'S SIX-ROWED, FOUR YEARS' TESTS, 22 SOWINGS.

| | | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. | Average. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 41 | 32 | 1892, | 42 | 24 | 1893, | 32 | 24 | 1894, | 18 | 16 | 33 | 36 |
| 2nd do | " | 42 | 44 | " | 42 | 24 | " | 17 | 24 | " | 16 | 12 | 29 | 38 |
| 3rd do | " | 39 | 8 | " | 55 | 00 | " | 27 | 24 | " | 15 | 20 | 34 | 13 |
| 4th do | " | 38 | 26 | " | 40 | 00 | " | 10 | 00 | " | 19 | 28 | 27 | $1\frac{1}{2}$ |
| 5th do | " | 32 | 39 | " | 35 | 00 | " | omitted | | " | 14 | 28 | 27 | $22\frac{1}{3}$ |
| 6th do | " | 29 | 38 | " | 30 | 00 | " | omitted | | " | 12 | 44 | 24 | $11\frac{1}{3}$ |

The average yield per acre each year was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings........... | 37 | $23\frac{1}{6}$ |
| 1892, do do ........... | 41 | 8 |
| 1893, do four do ........... | 21 | 42 |
| 1894, do six do ........... | 16 | $8\frac{2}{3}$ |
| Average for the four seasons 22 sowings.. | 29 | 36 |

This falls short of the average yield per acre of the two-rowed sorts for the same period by about $38\frac{1}{2}$ lbs.

### Comparison of Yields of Varieties of Spring Wheat.

In the tests conducted at the Experimental Farm, Nappan, N.S., the different varieties of wheat have yielded per acre as follows :—

CAMPBELL'S WHITE CHAFF, THREE YEARS' TESTS, 16 SOWINGS.

| | | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. | Average. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 29 | 30 | 1892, | 22 | 30 | 1893, | 17 | 30 | 23 | 10 |
| 2nd do | " | 34 | 00 | " | 20 | 00 | " | 20 | 00 | 24 | 40 |
| 3rd do | " | 34 | 35 | " | 17 | 30 | " | 20 | 00 | 24 | $1\frac{2}{3}$ |
| 4th do | " | 32 | 40 | " | 12 | 30 | " | 7 | 30 | 17 | $33\frac{1}{3}$ |
| 5th do | " | 32 | 40 | " | 12 | 30 | " | omitted | | 22 | 35 |
| 6th do | " | 26 | 00 | " | 10 | 00 | " | omitted | | 18 | 00 |

The average yield per acre each year was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings........... | 31 | $34\frac{1}{6}$ |
| 1892, do do ........... | 15 | 50 |
| 1893, do four do ........... | 16 | 15 |

| | Bush. | Lbs. |
|---|---|---|
| Average yield for the three seasons, 16 sowings..... | 21 | $48\frac{7}{16}$ |

RED FIFE, TWO YEARS' TESTS, 9 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | Average. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1893, | 17 30 | 1894, | 16 40............ | 17 5 |
| 2nd do | " | 17 30 | " | 16 30............ | 17 00 |
| 3rd do | " | 17 30 | " | 15 20............ | 16 25 |
| 4th do | " | 5 00 | " | 10 20............ | 7 40 |
| 5th do | " | omitted. | " | 11 40............ | 11 40 |
| 6th do | " | omitted. | " | did not ripen. | |

The average yield per acre was as follows :—

| | | |
|---|---|---|
| 1893, average of four sowings...................... | 14 | $22\frac{1}{2}$ |
| 1894, do five do ...................... | 14 | 6 |
| Average yield for the two seasons...................... | 14 | 14 |

Three other varieties were sown for one year each—

| | | |
|---|---|---|
| 1891, White Connell, average of six sowings.......... | 30 | $18\frac{4}{6}$ |
| 1892, Pringle's Champlain, average of six sowings..... | 20 | 00 |
| 1894, Stanley, average of five sowings............... | 17 | 8 |

In these tests of wheat at Nappan, N.S., the average yield of the sowings for three years 1891–2–3, of Campbell's White Chaff, was larger by 7 bush. 34 lbs. per acre than the average of the Red Fife for two years, 1893–4. Much of this gain is evidently due to the larger crop of 1891, for when these two varieties are compared for the same year, 1893, the difference in favour of the Campbell's White Chaff is less than 2 bushels, showing the important bearing which the character of the season has on the weight of the crop. The White Connell in 1891 was nearly equal in yield to Campbell's White Chaff that year, and both the other varieties which were tested in 1893 and 1894, exceeded the yield of Red Fife for the same years.

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## RESULTS OF TESTS AT THE EXPERIMENTAL FARM, BRANDON, MAN.

### Experiments with Oats.

1892—Varieties sown, Prize Cluster and Banner.

[On account of a snow storm, April 30th, the sowing of the oat plots on that date was omitted.]

| | | | Yield per Acre. Bush. | Lbs. | | Yield per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 23, | Prize Cluster........ | 30 | 30 | Banner............ | 59 | 24 |
| 2nd do | May 7 | do ........ | 33 | 8 | do ............ | 70 | 10 |
| 3rd do | do 14 | do ........ | 33 | 8 | do ............ | 69 | 5 |
| 4th do | do 21 | do ........ | 50 | 30 | do ............ | 60 | 10 |
| 5th do | do 28 | do ........ | 55 | 30 | do ............ | 62 | 22 |
| 6th do | June 4 | do ........ | 53 | 18 | do ............ | 60 | 2 |

1893—Varieties sown, Prize Cluster and Banner.

| | | | | | Yield per Acre. Bush. | Lbs. | | Yield per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May | 2, | Prize Cluster | ....... | 61 | 26 | Banner............ | 86 | 16 |
| 2nd | do | do | 9 | do ....... | 69 | 24 | do ............ | 75 | 10 |
| 3rd | do | do | 16 | do ........ | 64 | 24 | do .......... | 69 | 4 |
| 4th | do | do | 23 | do ....... | 48 | 28 | do ............ | 61 | 26 |
| 5th | do | do | 30 | do ....... | 52 | 12 | do ............ | 57 | 12 |
| 6th | do | do | 6 | do ....... | 50 | 30 | do ............ | 52 | 32 |

1894—Varieties sown, Abundance and Banner.

| | | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May | 1, | Abundance | ......... | 69 | 14 | Banner............ | 66 | 6 |
| 2nd | do | do | 8 | do ......... | 75 | 30 | do ............ | 74 | 24 |
| 3rd | do | do | 15 | do ......... | 71 | 6 | do ............ | 79 | 24 |
| 4th | do | do | 22 | do ......... | 61 | 16 | do ............ | 66 | 26 |
| 5th | do | do | 29 | do ......... | 34 | 24 | do ............ | 49 | 14 |
| 6th | do | June | 5 | do ......... | 50 | 30 | do ............ | 50 | 10 |

The average yield per acre each year of all the sowings of all the varieties of oats tested at the Experimental Farm, Brandon, Man., was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of twelve sowings ......... | 53 | $10\frac{3}{4}$ |
| 1893, do do ......... | 62 | $19\frac{5}{6}$ |
| 1894, do do ......... | 62 | $17\frac{10}{12}$ |

Average yield per acre of each of the successive sowings of oats, including all the varieties for the whole period of three years.

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of six tests.......... | 62 | $13\frac{2}{3}$ |
| 2nd do do .......... | 66 | $17\frac{2}{3}$ |
| 3rd do do .......... | 64 | $17\frac{3}{6}$ |
| 4th do do .......... | 58 | $11\frac{1}{3}$ |
| 5th do do .......... | 52 | 62 |
| 6th do do .......... | 53 | $3\frac{2}{3}$ |

In this series of tests the yields for the several years are fairly uniform, those for 1893 and 1894 being the largest, and nearly equal. The yields from the successive sowings are irregular, but the average shows a steady diminution after the third sowing, indicating that to obtain the best results in Manitoba, oats should be sown from the 7th to the 16th of May.

## Experiments with Barley.

1892—Varieties sown, Kinver Chevalier and Goldthorpe, both two-rowed sorts.

[On account of a snow storm, April 30th, the sowing of the barley plots on that date was omitted.]

| | | | | Yield per acre. Bush | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April 23, | Kinver Chevalier | .. | 40 | 20 | Goldthorpe................ | 50 | 20 |
| 2nd do | May 7 | do | .. | 50 | 00 | do ................ | 55 | 30 |
| 3rd do | do 14 | do | .. | 51 | 32 | do ................ | 51 | 32 |
| 4th do | do 21 | do | .. | 51 | 22 | do ................ | 64 | 28 |
| 5th do | do 28 | do | .. | 52 | 34 | do ................ | 61 | 2 |
| 6th do | June 4 | do | . | 61 | 33 | do ................ | 53 | 19 |

$2\frac{1}{2}$

1893—Varieties sown, Duck-bill two-rowed and Baxter's six-rowed.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May | 2, | Duck-bill ............ | 43 | 36 | Baxter's six-rowed....... | 40 | 40 |
| 2nd do | do | 9 | do ...... . ... | 42 | 34 | do do ...... | 28 | 16 |
| 3rd do | do | 16 | do ............ | 47 | 24 | do do ...... | 36 | 12 |
| 4th do | do | 23 | do ............ | 45 | 40 | do do ...... | 35 | 40 |
| 5th do | do | 30 | do ............ | 42 | 4 | do do ...... | 35 | 00 |
| 6th do | June | 6 | do ............ | 36 | 32 | do do ...... | 34 | 18 |

1894—Varieties sown, Canadian Thorpe two-rowed and Oderbruch six-rowed.

[In consequence of supply of seed running short, only four plots of the former and three of the latter were sown in this test.]

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May | 8, | Canadian Thorpe.. | 33 | 16 | Oderbruch.................. | 40 | 10 |
| 2nd do | do | 15 | do do .. | 32 | 34 | do .................. | 52 | 44 |
| 3rd do | do | 22 | do do .. | 40 | 00 | do .................. | 46 | 2 |
| 4th do | do | 29 | do do .. | 28 | 36 | | | |

The average yield per acre each year of all the sowings of all the varieties of barley tested at the Experimental Farm, Brandon, Man., was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of 12 sowings............ | 53 | 34⅔ |
| 1893, do do ............ | 39 | 4⅔ |
| 1894, do 7 do ............ | 39 | 6 5/7 |

Average yield per acre of each of the successive sowings of barley, including all the varieties for the whole period of three years :—

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of 6 tests ........... | 41 | 25⅔ |
| 2nd do do do ........... | 43 | 34⅓ |
| 3rd do do do ........... | 45 | 25 |
| 4th do do 5 do ........... | 45 | 14 |
| 5th do do 4 do ........... | 47 | 34 |
| 6th do do do ........... | 46 | 24 |

In these tests of barley the yields for 1892 are much heavier than those for 1893–94, the two latter years being practically equal. The results of the successive sowings show the heaviest yields in the later sowings, but in this instance the two later sowings have only been carried on for two years. As far as the experience goes, it seems to indicate that in Manitoba barley may be sown later than oats, and that the most favourable time for sowing is from the middle to the latter part of May.

The average of the 22 sowings of two-rowed barley have exceeded in yield the average of the 9 sowings of six-rowed by 8 bush. 23 lbs. per acre, but if we leave out of consideration the heavy crop of 1892, and compare the two rowed and six-rowed sorts for the same years, the advantage in favour of the two-rowed does not exceed half a bushel per acre.

## Experiments with Wheat.

### 1892—Varieties sown, Campbell's White Chaff and Red Fife.

[On account of a snow storm, April 30th, the sowing of the wheat plots on that date was omitted.]

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April 23, | Campbell's White | Chaff.. | 32 | 50 | Red Fife.............. | 33 | 20 |
| 2nd do | May 7 | do | do .. | 35 | 30 | do .............. | 36 | 50 |
| 3rd do | do 14 | do | do .. | 30 | 30 | do .............. | 37 | 10 |
| 4th do | do 21 | do | do .. | 30 | 50 | do .............. | 33 | 30 |
| 5th do | do 28 | do | do .. | 24 | 50 | do .............. | 29 | 40 |
| 6th do | June 6 | do | do .. | 19 | 30 | do .............. | 28 | 00 |

### 1893—Varieties sown, Campbell's White Chaff and Red Fife.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | May 2, | Campbell's White | Chaff.. | 23 | 30 | Red Fife.............. | 28 | 10 |
| 2nd do | do 9 | do | do .. | 23 | 00 | do .............. | 33 | 20 |
| 3rd do | do 16 | do | do .. | 17 | 00 | do .............. | 28 | 50 |
| 4th do | do 23 | do | do .. | 15 | 00 | do .............. | 26 | 40 |
| 5th do | do 30 | do | do .. | 15 | 00 | do .............. | 22 | 10 |
| 6th do | June 6 | do | do .. | 12 | 30 | do .............. | 18 | 50 |

### 1894—Varieties sown, Stanley and Red Fife.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | May 1, | Stanley.............. | 27 | 50 | Red Fife.................... | 33 | 40 |
| 2nd do | do 8 | do .............. | 28 | 40 | do .................... | 31 | 10 |
| 3rd do | do 15 | do .............. | 31 | 10 | do .................... | 33 | 00 |
| 4th do | do 22 | do .............. | 32 | 50 | do .................... | 32 | 10 |
| 5th do | do 29 | do .............. | 26 | 40 | do .................... | 29 | 20 |
| 6th do | June 5 | do .............. | 25 | 30 | do .................... | 22 | 40 |

## Summary of Results for the Whole Period.

The average yield per acre each year of all the sowings of all the varieties of wheat tested at the Experimental Farm, Brandon, Man., was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of 12 sowings............ | 31 | $2\frac{1}{2}$ |
| 1893, do do ............ | 22 | 00 |
| 1894, do do ............ | 29 | $33\frac{1}{3}$ |

Average yield per acre of each of the successive sowings of wheat, including all the varieties for the whole period of three years :—

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of 6 tests............ | 29 | $53\frac{2}{6}$ |
| 2nd do do ............ | 31 | 25 |
| 3rd do do ............ | 29 | $36\frac{4}{6}$ |
| 4th do do ............ | 28 | 30 |
| 5th do do ............ | 24 | $36\frac{4}{6}$ |
| 6th do do ............ | 21 | 10 |

In these experiments at Brandon the wheat crops of 1892 and 1894 were nearly equal, while that of 1893 fell nearly 7 bushels per acre short of the average of the other two years. The average yield of the successive sowings do not indicate any special advantage in very early sowing, but they do point to the importance of having all wheat sown by about the middle of May. The second sowing averaged the highest in the series, and the third was nearly equal to the first. There was in the fourth a slight falling off, which becomes very decided in the fifth and sixth, the crop steadily decreasing in proportion to the length of time that seeding is delayed.

The figures which have been given as the results of these week-apart sowings show the following averages for the entire number of tests of all varieties for the three years during which they have been carried on at the Experimental Farm at Brandon, Manitoba.

| Oats. | Yield per acre. Bush. Lbs. | Barley. | Yield per acre. Bush. Lbs. | Spring Wheat. | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing...... | 62 $13\frac{4}{6}$ | 1st sowing...... | 41 $23\frac{4}{6}$ | 1st sowing...... | 29 $53\frac{2}{6}$ |
| 2nd do ...... | 66 $17\frac{4}{6}$ | 2nd do ...... | 43 $34\frac{2}{6}$ | 2nd do ...... | 31 25 |
| 3rd do ...... | 64 $17\frac{3}{6}$ | 3rd do ...... | 45 25 | 3rd do ...... | 29 $36\frac{4}{6}$ |
| 4th do ...... | 58 $11\frac{2}{6}$ | 4th do ...... | 45 14 | 4th do ...... | 28 30 |
| 5th do ...... | 52 2 | 5th do ...... | 47 34 | 5th do ...... | 24 $36\frac{4}{6}$ |
| 6th do ...... | 53 $3\frac{2}{6}$ | 6th do ...... | 46 24 | 6th do ...... | 21 10 |

The average crop of each of the different sorts of grain is also submitted, including all the sowings of all the varieties for the whole period, as follows :—

| | Yield per acre. Bush. Lbs. |
|---|---|
| Oats, 36 sowings.. .................... | 59 $16\frac{3}{6}$ |
| Barley, 31 do ........................ | 44 $37\frac{6}{31}$ |
| Wheat, 36 do ........................ | 27 32 |

COMPARISON OF YIELDS OF VARIETIES OF OATS.

The different varieties of oats grown at the Experimental Farm at Brandon, Manitoba, in these week-apart sowings have yielded per acre, as follows :—

PRIZE CLUSTER, TWO YEARS' TESTS, 12 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | Average of two years. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1892, | 30 30 | 1893, | 61 26 | 46 11 |
| 2nd do | " | 33 8 | " | 69 24 | 51 16 |
| 3rd do | " | 33 8 | " | 64 24 | 48 33 |
| 4th do | " | 50 30 | " | 48 28 | 49 29 |
| 5th do | " | 55 30 | " | 52 12 | 54 4 |
| 6th do | " | 53 18 | " | 50 30 | 52 17 |

The average yield per acre for each year's sowings was as follows :—

| | Bush. Lbs. |
|---|---|
| 1892, average of six sowings.............. | 42 32 |
| 1893, do .............. | 58 $1\frac{2}{6}$ |
| Average for the two seasons.............. | 50 $16\frac{4}{6}$ |

BANNER, THREE YEARS' TESTS, 18 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | | Bush. Lbs. | Average of three years. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | 1892, | 59 24 | 1893, | 86 16 | 1894, | 66 6 | 70 $26\frac{2}{3}$ |
| 2nd do | " | 70 10 | " | 75 10 | " | 74 24 | 73 $14\frac{2}{3}$ |
| 3rd do | " | 69 5 | " | 69 4 | " | 79 24 | 72 $22\frac{1}{3}$ |
| 4th do | " | 60 10 | " | 61 26 | " | 66 26 | 62 32 |
| 5th do | " | 62 22 | " | 57 12 | " | 49 14 | 56 16 |
| 6th do | " | 60 2 | " | 52 32 | " | 50 10 | 54 $14\frac{2}{3}$ |

The average yield per acre for each year's sowings is as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of six sowings............. | 63 | $23\frac{3}{6}$ |
| 1893, do ............. | 67 | $5\frac{2}{6}$ |
| 1894, do ............. | 64 | $17\frac{2}{6}$ |
| Average for the three seasons............ | 65 | $4\frac{1}{8}$ |

One other variety, Abundance, was sown for one year only.

| | Bush. | Lbs. |
|---|---|---|
| 1894, Abundance, average of 6 sowings...... | 60 | 20 |

In comparing the results obtained from these several varieties of oats under test, it will be seen that the average yield of the Banner for three years has been 14 bush. 22 lbs. more per acre than that of the Prize Cluster for two years. The average of the Abundance for one year, 1894, has been 3 bush. 31 lbs. less than that of the Banner, for the same year.

### Comparison of Yields of Varieties of Barley.

The different varieties of barley grown at the Experimental Farm at Brandon, Man., in these week-apart sowings have yielded, per acre, as follows :—

*Two-rowed Sorts.*

| | | | | Average. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1892, Kinver Chevalier, | one season only, | | 6 sowings.... | 51 | $15\frac{3}{6}$ |
| " Gold-Thorpe, | do | do | do .... | 56 | $7\frac{4}{6}$ |
| 1893, Duck-bill, | do | do | do .... | 43 | $4\frac{2}{6}$ |
| 1894, Canadian Thorpe, | do | do | 4 sowings.... | 33 | $33\frac{1}{2}$ |
| Average yield per acre of the four varieties, 22 sowings in all | | | | 47 | $9\frac{5}{22}$ |

*Six-rowed Sorts.*

| | | | | | |
|---|---|---|---|---|---|
| 1893, Baxter's six-rowed, | 1 season only, | | 6 sowings.... | 35 | 5 |
| 1894, Oderbruch do | 1 | do | 3 do .... | 46 | $18\frac{2}{3}$ |
| Average yield per acre of the two six-rowed varieties.... | | | | 38 | $41\frac{5}{9}$ |

In this instance the two-rowed varieties have yielded an average of 8 bush. 16 lbs. per acre more than the average of the six-rowed sorts.

### Comparison of Yields of Varieties of Wheat.

The different varieties of wheat grown at the Experimental Farm at Brandon, Man., in these week-apart sowings have yielded, per acre, as follows :—

CAMPBELL'S WHITE CHAFF, TWO YEARS' TESTS, 12 SOWINGS.

| | | Bush. Lbs. | | | Average of two years. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | 1892, | 32 50, | 1893, | 23 30 | 28 20 |
| 2nd do | " | 35 30 | " | 23 00 | 29 15 |
| 3rd do | " | 30 30 | " | 17 00 | 23 45 |
| 4th do | " | 30 50 | " | 15 00 | 22 55 |
| 5th do | " | 24 50 | " | 15 00 | 19 55 |
| 6th do | " | 19 30 | " | 12 30 | 16 00 |

The average yield per acre of this wheat for each year was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of six sowings........ | 29 | 00 |
| 1893, do ........ | 17 | 40 |
| Average for the two seasons......... | 23 | 20 |

RED FIFE, THREE YEARS' TESTS, 18 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | | Bush. Lbs. | Average of three years. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | 1892, | 33 20, | 1893, | 28 10, | 1894, | 33 40 | 31 43⅓ |
| 2nd do | " | 36 50 | " | 33 20 | " | 31 10 | 33 46⅔ |
| 3rd do | " | 37 10 | " | 28 50 | " | 33 00 | 33 00 |
| 4th do | " | 33 30 | " | 26 40 | " | 32 10 | 30 46⅔ |
| 5th do | " | 29 40 | " | 22 10 | " | 29 20 | 27 3⅓ |
| 6th do | " | 28 00 | " | 18 50 | " | 22 40 | 23 10 |

The average yield per acre of the Red Fife for each year's sowings was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of six sowings .......... | 33 | 5 |
| 1893, do do ........... | 26 | 20 |
| 1894, do do ........... | 30 | 20 |
| Average for the three years............ | 29 | 55 |

One other variety, Stanley, was sown for one season only, 1894.

Stanley, average of six sowings. ........28 46⅘

From the figures given it will be seen that the Red Fife stands first in yield in these tests at Brandon, Man., by 6 bush. 25 lbs. per acre, closely followed by Stanley, which is a cross-bred variety between Ladoga and Red Fife.

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## RESULTS OF TESTS AT THE EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

### Experiments with Oats.

1891—Varieties sown, Prize Cluster and Banner.

[In this instance the two earliest sown plots of both varieties were destroyed by frost and strong winds.]

| | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 6, | Prize Cluster...... ... ... | | Banner................ ......... ... ... | |
| 2nd do | do 13 | do | ...... ... ... | do | ................. .... ... ... |
| 3rd do | do 20 | do | ...... 84 30 | do | ...... ...... ...... ..... 86 24 |
| 4th do | do 27 | do | ...... 86 24 | do | .......................... 88 4 |
| 5th do | May 4 | do | ...... 82 4 | do | .......................... 84 22 |
| 6th do | do 11 | do | ...... 86 20 | do | .......... .............. 77 22 |

1892—Varieties sown, Prize Cluster and Banner.

[In consequence of severe frost on May 2nd, the sowing of the third plot was deferred for a week, hence a period of two weeks occurs between the second and third sowings.]

| | | | Yield per acre Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 18, | Prize Cluster...... | 25 00 | Banner......................... | 38 18 |
| 2nd do | do 25 | do | ...... 47 22 | do | ........................ 51 6 |
| 3rd do | May 9 | do | ...... 44 4 | do | ......... ........... 51 15 |
| 4th do | do 16 | do | ...... 45 10 | do | ......................... 51 6 |
| 5th do | do 23 | do | ...... 52 32 | do | ......................... 59 24 |
| 6th do | do 30 | do | ...... 45 20 | do | ......................... 60 20 |

1893—Varieties sown, Prize Cluster and Banner.

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 24, | Prize Cluster...... | 72 | 2 | Banner........................ | 88 | 28 |
| 2nd do | May 1 | do ...... | 66 | 6 | do ........................ | 76 | 20 |
| 3rd do | do 8 | do ...... | 60 | 30 | do ........................ | 86 | 6 |
| 4th do | do 15 | do ...... | 56 | 10 | do ........................ | 87 | 12 |
| 5th do | do 22 | do ...... | 58 | 20 | do ........................ | 63 | 00 |
| 6th do | do 29 | do ...... | 46 | 6 | do ........................ | 61 | 26 |

1894—Varieties sown, Abundance and Banner.

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 24, | Abundance......... | 17 | 22 | Banner........................ | 19 | 4 |
| 2nd do | May 1 | do ......... | 33 | 28 | do ........................ | 30 | 30 |
| 3rd do | do 8 | do ......... | 29 | 14 | do ........................ | 27 | 32 |
| 4th do | do 15 | do ......... | 29 | 14 | do ........................ | 30 | 30 |
| 5th do | do 22 | do ......... | 23 | 18 | do ........................ | 21 | 6 |
| 6th do | do 29 | do ......... | 28 | 18 | do ........................ | 22 | 2 |

The average yield per acre each year of all the varieties of oats tested at the Experimental Farm at Indian Head, N.W.T., was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of eight sowings........... | 84 | $14\frac{1}{2}$ |
| 1892, do twelve do ........... | 68 | 18[1] |
| 1893, do do do ........... | 56 | $3\frac{5}{12}$ |
| 1894, do do do ........... | 26 | $6\frac{5}{6}$ |

Average yield per acre of each of the successive sowings of oats, including all the varieties for the whole period of four years.

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of six tests.......... | 43 | 18 |
| 2nd do do do .......... | 51 | $4\frac{4}{6}$ |
| 3rd do eight do .......... | 58 | $32\frac{1}{8}$ |
| 4th do do do .......... | 59 | $13\frac{6}{10}$ |
| 5th do do do .......... | 55 | $24\frac{2}{8}$ |
| 6th do do do .......... | 53 | 21 |

The year 1891 was a remarkably favourable year for oat-growing in portions of the North-West Territories, giving unusually heavy yields for all grain sown after the spring weather had fairly settled. The season of 1892 stands next in point of yield; 1893 averaged lower, but the year 1894 was unprecedented in its unfavourable conditions, owing to lack of rainfall and hot droughty weather. The rainfall at Indian Head that season was less than half that usually had, and on the Experimental Farm the long period of very dry weather resulted in unusually light crops of all sorts of grain, the yields being less than one-half of an average crop.

## Experiments with Barley.

1891—Varieties sown, Prize Prolific two-rowed and Baxter's Six-rowed.

[The two earliest plots in this case also were destroyed by frost and strong winds.]

| Sowing | Date | Variety | Yield per acre. Bush. | Lbs. | Variety | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 6, | Prize Prolific, | ... | ... | Baxter's Six-rowed, | ... | ... |
| 2nd do | do 13 | do | ... | .... | do do | .... | .... |
| 3rd do | do 20 | do | 40 | 30 | do do | 27 | 40 |
| 4th do | do 27 | do | 54 | 28 | do do | 40 | 00 |
| 5th do | May 4 | do | 54 | 00 | do do | 44 | 18 |
| 6th do | do 11 | do | 50 | 40 | do do | 50 | 10 |

1892—Varieties sown, Kinver Chevalier and Goldthorpe, both two-rowed sorts.

[On account of frost, May 2nd, the sowing of the barley plots on that date was omitted.]

| | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 18, | Kinver Chevalier, | 35 40 | Goldthorpe, | 18 40 |
| 2nd do | do 25 | do do | 41 12 | do | 34 24 |
| 3rd do | May 2 | do do | ... ... | do | ... ... |
| 4th do | do 9 | do do | 41 32 | do | 30 10 |
| 5th do | do 16 | do do | 46 32 | do | 36 00 |
| 6th do | do 23 | do do | 44 22 | do | 31 06 |

1893—Varieties sown, Duck-bill two-rowed and Baxter's Six-rowed.

| | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 24, | Duck-bill, | 48 24 | Baxter's Six-rowed, | 51 00 |
| 2nd do | May 1 | do | 50 00 | do do | 50 24 |
| 3rd do | do 8 | do | 50 00 | do do | 50 00 |
| 4th do | do 15 | do | 49 00 | do do | 50 24 |
| 5th do | do 22 | do | 46 00 | do do | 46 24 |
| 6th do | do 29 | do | 44 00 | do do | 49 00 |

1894—Varieties sown, Canadian Thorpe two-rowed and Oderbruch six-rowed.

| | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing, | April 24, | Canadian Thorpe, | 11 12 | Oderbruch, | 14 18 |
| 2nd do | May 1 | do | 10 00 | do | 20 20 |
| 3rd do | do 8 | do | 13 26 | do | 19 28 |
| 4th do | do 15 | do | 13 26 | do | 21 22 |
| 5th do | do 22 | do | 12 36 | do | 15 00 |
| 6th do | do 29 | do | 11 32 | do | 15 00 |

The average yield per acre each year of all the varieties of barley tested at the Experimental Farm, Indian Head, N.W.T., was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of eight sowings......... | 45 | $14\frac{3}{4}$ |
| 1892, do ten do ......... | 36 | $2\frac{6}{10}$ |
| 1893, do twelve do ......... | 48 | 36 |
| 1894, do do do ......... | 14 | $42\frac{1}{3}$ |

Average yield per acre of each of the successive sowings of barley, including all the varieties for the whole period of four years.

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of six tests......... | 28 | $46\frac{1}{3}$ |
| 2nd do do do ......... | 34 | $21\frac{1}{3}$ |
| 3rd do do do ......... | 33 | $28\frac{2}{3}$ |
| 4th do eight do ......... | 37 | $29\frac{3}{4}$ |
| 5th do do do......... | 37 | $31\frac{3}{4}$ |
| 6th do do do ......... | 37 | $1\frac{3}{4}$ |

The season of 1893 gave the highest yields of barley; 1891 was also a favourable year for this grain. A medium crop was realized in 1892, while 1894 gave a very small yield for the reasons already given. In the average yields of the several sowings, the earliest sown plots gave the smallest yield of any. The 4th, 5th and 6th sowings gave the largest returns, and were about equal in yield. It will be noticed that the crops of the several years are not uniform in this respect, in 1893 the three earlier sown plots averaged best.

## Experiments with Spring Wheat.

1891—Varieties sown, Campbell's White Chaff and White Connell.

| Sowing | | Date | | Variety | Yield per acre. Bush. Lbs. | Variety | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | | April | 6, | Campbell's White Chaff. | 30 26 | White Connell......... | 34 00 |
| 2nd | do | do | 13 | do do | 35 30 | do ......... | 32 00 |
| 3rd | do | do | 20 | do do | 34 00 | do ......... | 32 50 |
| 4th | do | do | 27 | do do | 37 46 | do ......... | 34 30 |
| 5th | do | May | 4 | do do | 35 30 | do ......... | 32 30 |
| 6th | do | do | 11 | do do | 36 10 | do ......... | 33 00 |

1892—Varieties sown, Campbell's White Chaff and Red Fife.

[On account of frost, April 29th, the sowing of the wheat plots on that date was omitted.]

| Sowing | | Date | | Variety | Yield per acre. Bush. Lbs. | Variety | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | | April | 15, | Campbell's White Chaff. | 29 40 | Red Fife.................. | 27 40 |
| 2nd | do | do | 22 | do do | 38 00 | do .................. | 30 00 |
| 3rd | do | do | 29 | do do | .......... | do .................. | ....... |
| 4th | do | May | 6 | do do | 28 50 | do .................. | 35 40 |
| 5th | do | do | 13 | do do | 36 40 | do .................. | 33 00 |
| 6th | do | do | 20 | do do | 33 20 | do .................. | 26 20 |

1893—Varieties sown, Campbell's White Chaff and Red Fife.

| Sowing | | Date | | Variety | Yield per acre. Bush. Lbs. | Variety | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | | April | 17, | Campbell's White Chaff. | 26 30 | Red Fife ................ | 24 40 |
| 2nd | do | do | 24 | do do | 31 40 | do .................. | 31 10 |
| 3rd | do | May | 1 | do do | 30 10 | do .................. | 37 00 |
| 4th | do | do | 8 | do do | 25 30 | do .................. | 32 30 |
| 5th | do | do | 15 | do do | 30 00 | do .................. | 30 00 |
| 6th | do | do | 22 | do do | 29 50 | do .................. | 29 10 |

1894—Varieties sown, Stanley and Red Fife.

| Sowing | | Date | | Variety | Yield per acre. Bush. Lbs. | Variety | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | | April | 20, | Stanley.............. | 15 50 | Red Fife...................... | 9 10 |
| 2nd | do | do | 27 | do .............. | 16 40 | do ...................... | 14 10 |
| 3rd | do | May | 4 | do .............. | 15 50 | do ...................... | 16 20 |
| 4th | do | do | 11 | do .............. | 16 00 | do ...................... | 17 00 |
| 5th | do | do | 18 | do .............. | 15 00 | do ...................... | 15 20 |
| 6th | do | do | 25 | do .............. | 15 50 | do ...................... | 17 50 |

The average yield per acre each year of all the varieties of spring wheat tested at the Experimental Farm at Indian Head, N.W.T., was as follows:

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of twelve sowings.......... | 34 | 1 |
| 1892, do ten do .......... | 31 | 55 |
| 1892, do twelve do .......... | 29 | $50\frac{10}{12}$ |
| 1893, do do do .......... | 15 | 25 |

Average yield per acre of each of the successive sowings of wheat, including all the varieties for the whole period of four years.

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of eight tests........ | 24 | $44\frac{1}{2}$ |
| 2nd do do do ........ | 28 | $38\frac{3}{4}$ |
| 3rd do six do ........ | 27 | $41\frac{2}{3}$ |
| 4th do eight do ........ | 28 | $28\frac{1}{4}$ |
| 5th do do do ........ | 28 | 30 |
| 6th do do do ........ | 37 | $41\frac{1}{4}$ |

In the tests of wheat also, the year 1891 gave the best average crop, 1892 stands next in yield, followed by 1893. The very unfavourable season of 1894 makes a poor showing in this connection. In this instance also, the first of the week-apart sowings gave the smallest yield,

the five later sowings being very nearly equal. The second, fourth and fifth do not vary more than 10 lbs. As far as these tests have gone, they indicate that the best time for sowing wheat in Eastern Assiniboia is from the middle of April to the middle of May, and seeding should in any case be finished by May 25th.

### Summary of Results for the Whole Period.

The following are the averages for the entire number of tests of all the varieties for the four years during which they have been carried on at the Experimental Farm at Indian Head, Assiniboia, North-west Territories.

| Oats. | Yield per acre. Bush. Lbs. | Barley. | Yield per acre. Bush. Lbs. | Spring Wheat. | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|
| 1st sowing........ | 43 18 | 1st sowing...... | 29 $46\frac{1}{3}$ | 1st sowing...... | 24 $44\frac{1}{2}$ |
| 2nd do ........ | 51 $01\frac{4}{6}$ | 2nd do ...... | 34 $21\frac{1}{3}$ | 2nd do ...... | 28 $38\frac{3}{4}$ |
| 3rd do ........ | 58 $32\frac{1}{8}$ | 3rd do ...... | 33 $28\frac{2}{3}$ | 3rd do ...... | 27 $41\frac{2}{3}$ |
| 4th do ........ | 59 $13\frac{6}{8}$ | 4th do ...... | 37 $29\frac{3}{4}$ | 4th do ...... | 28 $28\frac{1}{4}$ |
| 5th do ........ | 55 $24\frac{2}{8}$ | 5th do ..... | 37 $31\frac{3}{4}$ | 5th do ...... | 28 30 |
| 6th do ........ | 53 21 | 6th do ...... | 37 $1\frac{3}{4}$ | 6th do ...... | 27 $41\frac{1}{4}$ |

The average crop of each of the different sorts of grain is here given for the whole period, including all the sowings of all the varieties.

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| Oats (44 sowings)...................... | 54 | $9\frac{41}{44}$ |
| Barley (42 sowings)................... | 35 | $18\frac{40}{42}$ |
| Spring Wheat (46 sowings)............. | 27 | $39\frac{8}{46}$ |

### Comparison of Yields of Varieties of Oats.

The different varieties of oats grown at the Experimental Farm at Indian Head, N.W.T., in these week-apart sowings have yielded per acre, as follows :—

PRIZE CLUSTER, THREE YEARS' TESTS, 16 SOWINGS.
(In 1891 the first two sowings were destroyed by frost and winds.)

| | | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. | Average of three years Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891... | ......... | | 1892...... | 25 | 00 | 1893...... | 72 | 2 | 48 | 18 |
| 2nd do | " ... | ......... | | " ...... | 47 | 22 | " ...... | 66 | 6 | 56 | 31 |
| 3rd do | " ... | 84 | 30 | " ...... | 44 | 4 | " ...... | 60 | 30 | 63 | 10 |
| 4th do | " ... | 86 | 24 | " ...... | 45 | 10 | " ...... | 56 | 10 | 62 | 26 |
| 5th do | " ... | 82 | 4 | " ...... | 52 | 32 | " ...... | 58 | 20 | 64 | $18\frac{2}{3}$ |
| 6th do | " ... | 86 | 20 | " ...... | 45 | 20 | " ...... | 46 | 6 | 59 | $15\frac{1}{3}$ |

The average yield per acre from the sowings of each year was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of four sowings ........... | 85 | $2\frac{1}{2}$ |
| 1892, do six do ........... | 43 | $14\frac{2}{3}$ |
| 1893, do six do ........... | 60 | 1 |
| Average for the three seasons............ | 60 | $2\frac{1}{8}$ |

BANNER, FOUR YEARS TESTS, 22 SOWINGS.

(In 1891 the first two sowings were destroyed by frost and winds.)

| | | | | | Average of four years. |
|---|---|---|---|---|---|
| | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. |
| 1st sowing, 1891.. | ........ | 1892... 38 18 | 1893.... 88 28 | 1894.... 19 4 | 48 28 |
| 2nd do " .. | ........ | " .... 51 6 | " .... 76 20 | " .... 38 30 | 52 30 |
| 3rd do " .. | 86 24 | " ... 51 15 | " ... 86 6 | " ... 27 32 | 63 2¼ |
| 4th do " .. | 88 4 | " ... 51 6 | " ... 87 12 | " ... 30 30 | 64 13 |
| 5th do " .. | 84 22 | " ... 59 24 | " ... 63 00 | " ... 21 6 | 54 21½ |
| 6th do " .. | 77 22 | " ... 60 20 | " ... 61 26 | " ... 22 2 | 55 17½ |

The average yield per acre from the sowings of each year of the Banner oat was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of four sowings.......... | 84 | 8½ |
| 1892, do six do .......... | 52 | 3½ |
| 1893, do six do .......... | 77 | 9⅔ |
| 1894, do six do .......... | 25 | 11⅔ |
| Average for the four seasons............ | 57 | 17$\frac{17}{22}$ |
| One other variety, Abundance, was sown for one year only, 1894 : average of six sowings ...... | 27 | 2 |

In these records Banner does not give as good a total average as Prize Cluster by 2 bush. 19 lbs. per acre, but this is due to the fact that the Prize Cluster was not sown during the very unfavourable season of 1894. The great drought that year diminished the crop very much, reducing it to the low average of 25 bush. 11⅔ lbs., as compared with 64 bush. 17$\frac{2}{6}$ lbs., which was the yield at Brandon where the rainfall was heavier. This drought will also account for the light yield of Abundance in 1894, 27 bush. 2 lbs. per acre. It will, however, be noted that this compares well with the crop of Banner for that year.

## Comparison of Yields of Varieties of Barley.

The different varieties of barley grown at the Experimental Farm at Indian Head, N.W.T., in these week-apart sowings have yielded per acre, as follows :—

### Two-rowed Sorts.

| | Average. Bush. | Lbs. |
|---|---|---|
| 1891—Prize Prolific, 1 season only, four sowings... | 50 | ½ |
| In this instance the 1st and 2nd sowings were destroyed by frost and winds. | | |
| 1892—Kinver Chevalier, one season only, five sowings. | 41 | 46⅘ |
| do —Goldthorpe, do five do . | 30 | 6⅖ |
| 1893—Duck-bill, do six do . | 47 | 44 |
| 1884—Canadian Thorpe, do six do . | 12 | 6 |
| Average yield of the two-rowed varieties........... | 35 | 20 |

## Six-rowed Sorts.

### BAXTER'S SIX-ROWED, TWO YEARS' TESTS, 10 PLOTS.

In this instance also, the first and second sowings were destroyed by frost and winds.

| | | Bush. | Lbs. | | Bush. | Lbs. | Average. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891.... | .. | .. | 1893...... | 51 | 00 | 51 | 00 |
| 2nd do | " .... | .. | .. | " ...... | 50 | 24 | 50 | 24 |
| 3rd do | " .... | 27 | 40 | " ...... | 50 | 00 | 38 | 44 |
| 4th do | " .... | 40 | 00 | " ...... | 50 | 24 | 45 | 12 |
| 5th do | " .... | 44 | 18 | " ...... | 46 | 24 | 45 | 21 |
| 6th do | " .... | 50 | 10 | " ...... | 49 | 00 | 49 | 29 |

The average yield per acre of the Baxter's six-rowed each year was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of four sowings .......... | 40 | 29 |
| 1893, do six do .......... | 49 | 28 |
| Average yield for 2 years, from 10 sowings | 45 | $47\frac{6}{10}$ |

One other variety, Oderbruch, was sown for one season only, 1894.

| | Bush. | Lbs. |
|---|---|---|
| Oderbruch, average of six sowings ........... | 17 | $30\frac{4}{6}$ |
| Average yield of the six-rowed sorts, 16 sowings.. | 35 | $17\frac{1}{4}$ |

## Comparison of Yields of Varieties of Wheat.

In the tests conducted at the Experimental Farm, Indian Head, N.W.T., the different varieties of wheat have yielded per acre, as follows :—

### CAMPBELL'S WHITE CHAFF, THREE YEARS' TESTS, 17 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs | | Bush. Lbs. | Average of three years. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 30 26 | 1892, | 29 40 | 1893, | 26 30 | 28 52 |
| 2nd do | " | 35 30 | " | 38 00 | " | 31 40 | 35 $3\frac{1}{3}$ |
| 3rd do | " | 34 00 | " | omitted | " | 30 10 | 32 5 |
| 4th do | " | 37 46 | " | 28 50 | " | 25 30 | 30 42 |
| 5th do | " | 35 30 | " | 36 40 | " | 30 00 | 34 $3\frac{1}{3}$ |
| 6th do | " | 36 10 | " | 33 20 | " | 29 50 | 33 $6\frac{2}{3}$ |

The average yield per acre of the Campbell's White Chaff wheat each year was as follows :—

| | Average. Bush. Lbs. |
|---|---|
| 1891, average of six sowings .......... | 34 53 |
| 1892, do five do .......... | 33 18 |
| 1893, do six do .......... | 28 $56\frac{2}{3}$ |
| Average yield for 3 years, 17 sowings... | 32 $24\frac{2}{17}$ |

### RED FIFE, THREE YEARS' TESTS, 17 SOWINGS.

| | | Bush. Lbs. | | Bush. Lbs. | | Bush. Lbs. | Average of three years. Bush. Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | 1892, | 27 40 | 1893, | 24 40 | 1894, | 9 10 | 20 30 |
| 2nd do | " | 30 00 | " | 31 10 | " | 14 10 | 25 $9\frac{2}{3}$ |
| 3rd do | " | omitted | " | 37 00 | " | 16 20 | 26 40 |
| 4th do | " | 35 40 | " | 32 30 | " | 17 17 | 28 $23\frac{1}{3}$ |
| 5th do | " | 33 00 | " | 30 00 | " | 15 20 | 26 $6\frac{2}{3}$ |
| 6th do | " | 26 20 | " | 29 10 | " | 17 50 | 24 $26\frac{2}{3}$ |

The average yield per acre of the Red Fife for each year was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1892, average of five sowings......... | 30 | 32 |
| 1893, do six do ......... | 30 | 45 |
| 1894, do six do ......... | 14 | 58$\frac{1}{3}$ |
| Average for the three years, 17 sowings. | 25 | 14$\frac{14}{17}$ |

Two other varieties were sown, each for one year only:

| | Bush. | Lbs. |
|---|---|---|
| 1891, White Connell, average per acre of six sowings............................ | 33 | 8$\frac{1}{2}$ |
| 1894, Stanley, average per acre of six sowings.. | 15 | 51$\frac{2}{3}$ |

These figures show that the Campbell's White Chaff for the three years of 1891–92–93 has exceeded Red Fife sown in 1892–93–94 in average yield, by 7 bush. 42 lbs. per acre. This, however, is mainly due to the bad record made by the Red Fife during the very dry year of 1894, when Campbell's White Chaff was not sown. Comparing the results of the two years, 1892–93, when both the varieties were sown, we find the difference to be a little less than one bushel in favour of the Campbell's White Chaff. The Stanley, which is a very promising beardless wheat, one of the new cross-bred sorts recently produced at the Central Experimental Farm, also makes a poor showing, for the reason that it has been used in these tests at Indian Head only once, and that was in 1894. It yielded, however, that year nearly a bushel more per acre than the Red Fife.

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## RESULTS OF TESTS AT THE EXPERIMENTAL FARM, AGASSIZ, BRITISH COLUMBIA.

### Experiments with Oats.

1891—Varieties sown, Prize Cluster and Banner.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 15, | Prize Cluster........... | 38 | 18 | Banner................ | 43 | 8 |
| 2nd do | do 22 | do ................ | 40 | 00 | do ................ | 47 | 32 |
| 3rd do | do 29 | do ................ | 37 | 22 | do ................ | 50 | 20 |
| 4th do | May 6 | do ................ | 32 | 22 | do ................ | 39 | 14 |
| 5th do | do 13 | do ................ | 41 | 6 | do ................ | 44 | 24 |
| 6th do | do 20 | do ................ | 47 | 2 | do ................ | 66 | 6 |

1892—Varieties sown, Prize Cluster and Banner.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 12, | Prize Cluster............... | 37 | 22 | Banner................ | 53 | 8 |
| 2nd do | do 19 | do ................ | 48 | 18 | do ................ | 52 | 2 |
| 3rd do | do 26 | do ................ | 38 | 28 | do ................ | 56 | 31 |
| 4th do | May 3 | do ................ | 46 | 7 | do ................ | 75 | 31 |
| 5th do | do 10 | do ................ | 44 | 14 | do ................ | 80 | 10 |
| 6th do | do 17 | do ................ | 51 | 16 | do ................ | 82 | 32 |

1893—Varieties sown, Prize Cluster and Banner.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush, | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 19, | Prize Cluster............... | 36 | 6 | Banner................ | 47 | 22 |
| 2nd do | do 26 | do ................ | 48 | 8 | do ................ | 49 | 4 |
| 3rd do | May 3 | do ................ | 42 | 12 | do ................ | 51 | 16 |
| 4th do | do 10 | do ................ | 42 | 12 | do ................ | 57 | 32 |
| 5th do | do 17 | do ................ | 42 | 32 | do ................ | 64 | 24 |
| 6th do | do 24 | do ................ | 52 | 22 | do ................ | 67 | 32 |

1894—Varieties sown, Abundance and Banner.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 24, | Abundance | 41 | 6 | Banner | 43 | 8 |
| 2nd do | May 1 | do | 38 | 3 | do | 48 | 16 |
| 3rd do | do 8 | do | 41 | 16 | do | 42 | 27 |
| 4th do | do 15 | do | 32 | 7 | do | 32 | 32 |
| 5th do | do 22 | do | 35 | 20 | do | 31 | 31 |
| 6th do | do 29 | do | 41 | 6 | do | 47 | 22 |

The average yield per acre each year of all the varieties of oats tested at the Experimental Farm at Agassiz, B.C., was as follows:—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of twelve sowings | 44 | $3\frac{1}{6}$ |
| 1892, do do | 55 | $23\frac{1}{12}$ |
| 1893, do do | 50 | 10 |
| 1894, do do | 39 | $24\frac{2}{3}$ |

Average yield per acre of each of the successive sowings of oats, including all the varieties for the whole period of four years:—

| | Bush. | Lbs. |
|---|---|---|
| 1st sowing, average of eight tests | 42 | $20\frac{6}{8}$ |
| 2nd do do | 46 | $18\frac{1}{8}$ |
| 3rd do do | 45 | $8\frac{6}{8}$ |
| 4th do do | 44 | $32\frac{3}{8}$ |
| 5th do do | 48 | $7\frac{3}{8}$ |
| 6th do do | 57 | $5\frac{4}{8}$ |

On the Pacific coast the best year of the four was 1892, followed by 1893, 1891 and 1894. In 1892 the average yield was about 16 bushels more per acre than that of the poorest year, 1894.

In the week-apart sowings the earliest sowing has given the smallest average yield, and the sixth sowing much the best. The fifth stands next in order of yield to the sixth. As the last sown plot has given uniformly during three years out of four the largest yield of any in the series, it would appear that the latter half of May is the best time for sowing oats in the coast climate of British Columbia.

## Experiments with Barley.

1891—Varieties sown, Prize Prolific two-rowed and Baxter's six-rowed.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 15, | Prize Prolific | 23 | 26 | Baxter's six-rowed | 20 | 40 |
| 2nd do | do 22 | do | 23 | 46 | do | 22 | 24 |
| 3rd do | do 29 | do | 23 | 16 | do | 20 | 40 |
| 4th do | May 6 | do | 22 | 44 | do | 22 | 4 |
| 5th do | do 13 | do | 29 | 8 | do | 23 | 16 |
| 6th do | do 20 | do | 31 | 12 | do | 28 | 16 |

1892—Varieties sown, Prize Prolific two-rowed and Baxter's six-rowed.

| | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, | April 12, | Prize Prolific | 31 | 7 | Baxter's six-rowed | 33 | 16 |
| 2nd do | do 19 | do | 36 | 29 | do | 22 | 45 |
| 3rd do | do 26 | do | 27 | 44 | do | 26 | 37 |
| 4th do | do 3 | do | 39 | 10 | do | 32 | 14 |
| 5th do | do 10 | do | 33 | 28 | do | 35 | 40 |
| 6th do | do 17 | do | 41 | 22 | do | 40 | 40 |

1893—Varieties sown, Duck-bill two-rowed and Baxter's six-rowed.

In this instance only five plots of the Duck-bill were sown.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 19, | Duck-bill | 18 | 46 | Baxter's six-rowed | 29 | 40 |
| 2nd do | do | 26 | do | 17 | 14 | do | 17 | 24 |
| 3rd do | May | 3 | do | 17 | 14 | do | 16 | 12 |
| 4th do | do | 10 | do | 14 | 8 | do | 17 | 4 |
| 5th do | do | 17 | do | 21 | 12 | do | 18 | 36 |
| 6th do | do | 24 | do | | | do | 18 | 16 |

The usual series of barley plots was sown in 1894, but they were very much injured by standing water during the time of the flood, and the results were so unsatisfactory and irregular that if given in this connection they would only be misleading. The flood did not overflow any part of the Experimental Farm, but the open porous subsoil was so filled with water that it oozed through the surface in spots all over the lower ground. The plots of oats on higher ground were uninjured, but those of barley and wheat were located on a lower level and suffered very much.

The average yield per acre each year of all the varieties of barley tested at the Experimental Farm at Agassiz, B.C., was as follows:—

| | | | Bush. | Lbs. |
|---|---|---|---|---|
| 1891, | average of | twelve sowings | 24 | $19\frac{10}{12}$ |
| 1892, | do | do | 33 | $23\frac{8}{12}$ |
| 1893, | do | eleven sowings | 17 | $46\frac{8}{11}$ |

Average yield per acre of each of the successive sowings of barley, including all the varieties for the whole period of three years.

| | | | Bush. | Lbs. |
|---|---|---|---|---|
| 1st sowing, | | average of six tests | 24 | $37\frac{1}{6}$ |
| 2nd | do | do | 23 | $22\frac{2}{6}$ |
| 3rd | do | do | 22 | $3\frac{1}{6}$ |
| 4th | do | do | 24 | 30 |
| 5th | do | do | 26 | $45\frac{4}{6}$ |
| 6th | do | average of five tests | 32 | 2 |

In the case of the barley also the season of 1892 gave much the largest yield, followed by 1891, while the returns for 1893 were very light. The average results from the first four sowings are fairly even, but there is a decided increase in the fifth and sixth sowings. The fact that the larger yield of the last sown plot is shown almost uniformly in the returns for each year, would indicate that from the 15th to 25th May is the best time for sowing barley in the neighbourhood of Agassiz.

## Experiments with Spring Wheat.

1891—Varieties sown, Campbell's White Chaff and White Connell.

| | | | | Yield per acre. Bush. | Lbs. | | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | April | 15, | Campbell's White Chaff | 22 | 10 | White Connell | 21 | 20 |
| 2nd do | do | 22 | do do | 19 | 50 | do | 20 | 00 |
| 3rd do | do | 29 | do do | 19 | 50 | do | 16 | 20 |
| 4th do | May | 6 | do do | 15 | 50 | do | 17 | 10 |
| 5th do | do | 13 | do do | 18 | 40 | do | 22 | 20 |
| 6th do | do | 20 | do do | 27 | 10 | do | 25 | 00 |

1892—Varieties sown, Campbell's White Chaff and Red Fife.

| | | | | Yield per acre. Bush. Lbs. | | Yield per acre. Bush. Lbs. |
|---|---|---|---|---|---|---|
| 1st sowing, | April 12, | Campbell's | White Chaff | 25 5 | Red Fife | 32 10 |
| 2nd do | do 19 | do | do | 21 40 | do | 21 50 |
| 3rd do | do 26 | do | do | 18 00 | do | 23 30 |
| 4th do | May 3 | do | do | 28 20 | do | 32 20 |
| 5th do | do 10 | do | do | 28 00 | do | 28 45 |
| 6th do | do 17 | do | do | 27 10 | do | 31 50 |

1893—Varieties sown, Campbell's White Chaff and Red Fife.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1st sowing, | April 19, | Campbell's | White Chaff | 17 00 | Red Fife | 26 42 |
| 2nd do | do 26 | do | do | 22 00 | do | 26 40 |
| 3rd do | May 3 | do | do | 15 35 | do | 25 40 |
| 4th do | do 10 | do | do | 17 30 | do | 24 50 |
| 5th do | do 17 | do | do | 9 20 | do | 15 15 |
| 6th do | do 24 | do | do | 15 52 | do | 21 15 |

The usual series of wheat plots was sown in 1894, but they were so much injured by water percolating through the soil during the period of the flood that the results are not given for the reason that they would be misleading.

The average yield per acre each year of all the varieties of spring wheat tested at the Experimental Farm at Agassiz, B. C., was as follows :—

| | Bush. Lbs. |
|---|---|
| 1891, average of twelve sowings.......... | 20 28$\frac{4}{12}$ |
| 1892, do do .......... | 26 33$\frac{4}{12}$ |
| 1893, do do .......... | 19 49$\frac{11}{12}$ |

Average yield per acre of each of the successive sowings of spring wheat, including all the varieties for the whole period of three years.

| | |
|---|---|
| 1st sowing, average of six tests ............. | 24 4$\frac{3}{6}$ |
| 2nd do do ............. | 22 .. |
| 3rd do do ............. | 19 49$\frac{1}{6}$ |
| 4th do do ............. | 22 40 |
| 5th do do ............. | 20 23$\frac{2}{6}$ |
| 6th do do ............. | 24 42$\frac{5}{6}$ |

In this instance, also the crop of 1892 was the largest followed in the order of yield by 1891 and 1893. From the small and irregular yields of Campbell's White Chaff in 1893 as compared with Red Fife that year, an average of 16 bush. 11 lbs. against 23 bush. 23 lbs., it is likely that, although the soil seemed equally good, it was nevertheless poorer and uneven in quality.

In the successive sowings the sixth plot makes the best record, but the yield of the first and last are nearly equal, while the intermediate sowings are all lower in yield. From this it would appear that spring wheat may be sown at any time from the middle of April to the 20th of May, with good prospects of success in that climate.

## Summary of Results for the Whole Period.

The following are the averages for the whole of the tests of all varieties for the three or four years during which they have been carried on at the Experimental Farm at Agassiz, British Columbia.

| Oats. | Yield per acre. Bush. | Lbs. | Barley. | Yield per acre. Bush. | Lbs. | Spring Wheat. | Yield per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing ...... | 42 | 20$\frac{6}{8}$ | 1st sowing...... | 24 | 37$\frac{1}{6}$ | 1st sowing...... | 24 | 4$\frac{3}{6}$ |
| 2nd do ...... | 46 | 18$\frac{7}{8}$ | 2nd do ...... | 23 | 22$\frac{2}{6}$ | 2nd do ...... | 22 | 00 |
| 3rd do ...... | 45 | 8$\frac{6}{8}$ | 3rd do ...... | 22 | 3$\frac{1}{6}$ | 3rd do ...... | 19 | 49$\frac{1}{6}$ |
| 4th do ...... | 44 | 32$\frac{3}{8}$ | 4th do ...... | 24 | 30 | 4th do ...... | 22 | 40 |
| 5th do ...... | 48 | 7$\frac{3}{8}$ | 5th do ...... | 26 | 45$\frac{4}{6}$ | 5th do ...... | 20 | 23$\frac{2}{6}$ |
| 6th do ...... | 57 | 4$\frac{4}{8}$ | 6th do ...... | 32 | 2 | 6th do ...... | 24 | 42$\frac{5}{6}$ |

The average crop of each of the different sorts of grain is also submitted, covering all the sowings of all the varieties for the whole period, as follows :—

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| Oats (48 sowings)......................... | 47 | 15$\frac{1}{2}$ |
| Barley (35 sowings)........................ | 25 | 22$\frac{2}{3}\frac{8}{5}$ |
| Spring wheat (36 sowings).. .............. | 22 | 16$\frac{3}{4}$ |

## Comparison of Yields of Varieties of Oats.

The different varieties of oats grown at the Experimental Farm at Agassiz, B.C., in these week-apart sowings have yielded per acre as follows :—

### Prize Cluster, Three Years' Tests, 18 Sowings.

| | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Average for three years. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891.. | 38 | 18 | 1992, | 37 | 22 | 1893, | 36 | 6 | 37 | 15$\frac{1}{3}$ |
| 2nd do | " .. | 40 | 00 | " | 48 | 18 | " | 48 | 8 | 45 | 20 |
| 3rd do | " .. | 37 | 22 | " | 38 | 28 | " | 42 | 12 | 39 | 20$\frac{2}{3}$ |
| 4th do | " .. | 32 | 22 | " | 46 | 7 | " | 42 | 12 | 40 | 13$\frac{2}{3}$ |
| 5th do | " .. | 41 | 6 | " | 44 | 14 | " | 42 | 32 | 42 | 28$\frac{2}{3}$ |
| 6th do | " .. | 47 | 2 | " | 51 | 16 | " | 52 | 22 | 50 | 13$\frac{1}{3}$ |

The average yield per acre of this variety of oats for the six sowings in each year was as follows :—

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings........... | 39 | 17$\frac{2}{6}$ |
| 1892, do do ........... | 44 | 17$\frac{3}{6}$ |
| 1893, do do ........... | 44 | 4 |
| Average for the three years, 18 sowings... | 42 | 24$\frac{2}{6}$ |

### BANNER, FOUR YEARS' TESTS, 24 SOWINGS.

| | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Year | Bush. | Lbs. | Average for four years. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891..... | 43 | 8 | 1892... | 53 | 8 | 1893... | 47 | 22 | 1894... | 43 | 8 | 46 | 28$\frac{1}{2}$ |
| 2nd do | " ...... | 47 | 32 | " ... | 52 | 2 | " ... | 49 | 4 | " ... | 48 | 16 | 49 | 13$\frac{1}{2}$ |
| 3rd do | " ...... | 50 | 20 | " ... | 56 | 31 | " .. | 51 | 16 | " ... | 42 | 27 | 50 | 15 |
| 4th do | " ...... | 39 | 14 | " ... | 75 | 31 | " ... | 57 | 32 | " ... | 32 | 32 | 51 | 18$\frac{3}{4}$ |
| 5th do | " ...... | 44 | 24 | " ... | 80 | 10 | " ... | 64 | 24 | " ... | 31 | 31 | 55 | 13$\frac{3}{4}$ |
| 6th do | " ...... | 66 | 6 | " ... | 82 | 32 | " ... | 67 | 32 | " ... | 47 | 22 | 66 | 6 |

The average yield per acre of Banner oats for the six sowings in each year is as follows :—

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings............. | 48 | 23 |
| 1892, do do ............. | 66 | $30\frac{2}{6}$ |
| 1893, do do ............. | 56 | 16 |
| 1894, do do ............. | 41 | $5\frac{4}{6}$ |
| Average for the four years, 24 sowings..... | 53 | $10\frac{1}{2}$ |

The only other variety of oats used in these tests, was the Abundance, which has been sown for one season only, 1894. The average of the six sowings of this variety for that year was 38 bush. $9\frac{4}{6}$ lbs. per acre.

From the above figures it will be seen that the average yield of the Banner oat for four years has exceeded that of the Prize Cluster by 10 bush. 20 lbs. per acre, from which we may infer that the choice of a prolific variety of oats for sowing is of great importance, and this, coupled with medium late sowing, is likely to prove most profitable in the vicinity of Agassiz, B.C.

### Comparison of Yields of Varieties of Barley.

In the tests conducted at the Experimental farm at Agassiz, B.C., the different varieties of barley have yielded per acre as follows :—

#### Two-rowed Sorts.

##### PRIZE PROLIFIC, TWO YEARS' TESTS, 12 SOWINGS.

| | Bush. | Lbs. | | Bush. | Lbs. | Average for two years. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|
| 1st sowing, 1891.... | 23 | 26 | 1892...... | 31 | 7 | 27 | $16\frac{1}{2}$ |
| 2nd do " .... | 23 | 46 | " ...... | 36 | 29 | 30 | $13\frac{1}{2}$ |
| 3rd do " .... | 23 | 16 | " ...... | 27 | 44 | 25 | 30 |
| 4th do " .... | 22 | 44 | " ..... | 39 | 10 | 31 | 3 |
| 5th do " .... | 29 | 8 | " ...... | 33 | 28 | 31 | 18 |
| 6th do " .... | 31 | 12 | " ...... | 41 | 22 | 36 | 17 |

The average yield per acre of the Prize Prolific barley for the two years' sowing is herewith given—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings............ | 25 | $33\frac{2}{6}$ |
| 1892, do do ............ | 34 | $47\frac{2}{6}$ |
| Average yield for the two years, 12 sowings | 30 | $16\frac{1}{6}$ |
| Duck-bill, sown for one year only, 1893, 5 sowings, average..................... | 17 | 38 |

The average yield of the two varieties of two-rowed barley named for the three years, 17 sowings, was 26 bushels, 42 lbs. per acre.

## Six-rowed Sorts.

BAXTER'S SIX-ROWED, THREE YEARS' TESTS, 18 SOWINGS.

| | | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. | Average of three years. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 20 | 40 | 1892, | 33 | 16 | 1893, | 20 | 40 | 25 | 00 |
| 2nd do | " | 22 | 24 | " | 22 | 45 | " | 17 | 24 | 20 | 47 |
| 3rd do | " | 20 | 40 | " | 26 | 37 | " | 16 | 12 | 21 | 13⅔ |
| 4th do | " | 22 | 4 | " | 32 | 14 | " | 17 | 4 | 23 | 39⅓ |
| 5th do | " | 23 | 16 | " | 35 | 40 | " | 18 | 36 | 25 | 43⅓ |
| 6th do | " | 28 | 16 | " | 40 | 40 | " | 18 | 16 | 29 | 8 |

The average yield of this barley for each year was as follows :—

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings.............. | 22 | 47 2/6 |
| 1892, do do .............. | 32 | 00 |
| 1893, do do .............. | 18 | 06 |
| Average yield for the three years, 18 sowings. | 24 | 17¾ |

In these experiments the average yield of the two-rowed barley has exceeded that of the six-rowed by 2 bushels, 24¼ lbs.

## Comparison of Yields of Varieties of Wheat.

In the tests conducted at the Experimental Farm at Agassiz, B.C., the different varieties of spring wheat have yielded per acre as follows :—

CAMPBELL'S WHITE CHAFF, THREE YEARS' TESTS. 18 SOWINGS.

| | | Bush. | Lbs. | | Bush. | Lbs. | | Bush. | Lbs. | Average of three years. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1891, | 22 | 10 | 1892, | 25 | 5 | 1893, | 17 | 00 | 21 | 25 |
| 2nd do | " | 19 | 50 | " | 21 | 40 | " | 22 | 00 | 21 | 15 |
| 3rd do | " | 19 | 50 | " | 18 | 00 | " | 15 | 35 | 17 | 48⅓ |
| 4th do | " | 15 | 50 | " | 28 | 20 | " | 17 | 30 | 20 | 33⅓ |
| 5th do | " | 18 | 40 | " | 28 | 00 | " | 9 | 20 | 18 | 40 |
| 6th do | " | 27 | 10 | " | 27 | 10 | " | 15 | 52 | 23 | 24 |

The average yield per acre for the six sowings of this wheat each year was as follows :—

| | Bush. | Lbs. |
|---|---|---|
| 1891, average of six sowings............. | 20 | 35 |
| 1892, do do ............. | 24 | 42 3/6 |
| 1893, do do ............. | 16 | 12⅚ |
| Average for the three years, 18 sowings.... | 20 | 30⅛ |

RED FIFE, TWO YEARS' TESTS.

| | | Bush. | Lbs. | | Bush. | Lbs. | Average for the two years. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| 1st sowing, | 1892, | 32 | 10 | 1893, | 26 | 42 | 29 | 26 |
| 2nd do | " | 21 | 50 | " | 26 | 40 | 24 | 15 |
| 3rd do | " | 23 | 30 | " | 25 | 40 | 24 | 35 |
| 4th do | " | 32 | 20 | " | 24 | 50 | 28 | 35 |
| 5th do | " | 28 | 45 | " | 15 | 15 | 22 | 00 |
| 6th do | " | 31 | 50 | " | 21 | 15 | 26 | 32½ |

The average yield per acre of the Red Fife for each year was as follows :—

| | Yield per acre. Bush. | Lbs. |
|---|---|---|
| 1892, average of six sowings.............. | 28 | 24⅙ |
| 1893, do do ............... | 23 | 33 4/6 |
| Average for the two years................ | 25 | 53⅚ |

Another variety of wheat, the White Connell, was sown for one season 1891, when the average of the six sowings was 20 bushels, 21$\frac{4}{6}$ lbs. per acre.

It will be seen that as far as these tests at Agassiz, B.C , have gone, with oats and barley, the best average results have been had from the last two sowings the dates of which have varied in different years from the 10th to the 29th of May. This experience is very different from that obtained in the east, where early sowing of both these grains gives a great advantage. This shows that it does not necessarily follow, that a course which experience has shown to be the very best practice in the eastern provinces, will be equally good in the west under other conditions of climate.

In the case of the spring wheat, the last sowings have averaged the best, the first sowings standing next in yield.

## CONCLUSIONS.

The great variations which occur in seasons in different parts of the Dominion as indicated by the figures which have been given, show the necessity for caution in drawing any very positive conclusions; nevertheless some general deductions of a reliable and useful character may, I think, be safely drawn from the experience which has been gained. The varying results had in the different climates of the Dominion also serve to show the great importance and usefulness of the branch experimental farms, which give opportunity for conducting such valuable experiments in the more important agricultural districts in the different Provinces and Territories of the Dominion.

The average results of all the week-apart sowings at the Central Experimental Farm, which may be taken as a fairly safe guide by the farmers of Ontario and Quebec, continued during five years, show a steady falling off in crop from week to week. Between the first and second sowings both made within a week, the difference is not much, but if seeding is delayed two weeks or more, the loss is very serious, as shown by the following figures (omitting fractions).

| Losses Experienced at the Central Experimental Farm by delay in seeding. | Oats. Loss per acre. | | Barley. Loss per acre. | | Spring wheat Loss per acre. | |
|---|---|---|---|---|---|---|
| | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Loss arising from a delay of two weeks........ | 12 | 5 | 9 | 11 | 6 | 31 |
| do do do three do ......... | 16 | 20 | 13 | 2 | 8 | 35 |
| do do do four do ......... | 20 | 1 | 18 | 30 | 9 | 31 |
| do do do five do ......... | 29 | 1 | 19 | 37 | 11 | 12 |

This is a most important lesson which should be taken to heart by farmers generally throughout Ontario and Quebec, and early seeding should become the general practice.

At the Experimental Farm at Nappan, N. S., where the climate fairly represents the larger part of the Maritime Provinces, the question of very early seeding does not appear to be so vital. The average of the first three sowings have produced results nearly equal ; the subsequent sowings however, show a considerable falling off, which is steady from week to week, except in the case of the wheat.

| Losses Experienced at the Experimental Farm, Nappan, N.S., by delay in seeding. | Oats. Loss per acre. | | Barley. Loss per acre. | | Wheat. Loss per acre. | |
|---|---|---|---|---|---|---|
| | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Loss occuring from a delay of three weeks ..... | 8 | 4 | 6 | 3 | 5 | 40 |
| do do do four do ...... | 10 | 5 | 6 | 30 | 1 | 58 |
| do do do five do ...... | 18 | 29 | 10 | 00 | 3 | 57 |

At the Experimental Farm at Brandon, Man., there was no material falling off in the yield of either oats or wheat, until the last two sowings ; in barley the later sowings have given the best results : hence it does not appear, as far as these tests have gone, that early seeding is specially advantageous for Manitoba. The seeding of wheat and oats should, however, be finished by the 20th to the 25th of May, and barley by the 1st of June.

At the Experimental Farm at Indian Head, the advantage throughout has thus far been on the side of later sowing, provided it be finished by the 15th to the 25th of May, depending on the earliness of the season.

At the Experimental Farm at Agassiz, the results of experience thus far gained, are also in favour of later seeding, but seeding should be finished in the coast climate of British Columbia by the 15th to the 25th of May.

## COMPARATIVE YIELDS OF GRAIN FROM THE SEVERAL EXPERIMENTAL FARMS.

The respective yields of some of the different varieties of grain which have been tested at the several Experimental Farms in these week-apart sowings, will now be given, referring only to those which have been tested for several years, and omitting fractions.

| Average Yields of all week-apart sowings of grain. | Central Experimental Farm. Yield per acre. | | Experimental Farm, Nappan, N.S. Yield per acre. | | Experimental Farm, Brandon, Man. Yield per acre. | | Experimental Farm, Indian Head, N.W.T. Yield per acre. | | Experimental Farm, Agassiz, B.C. Yield per acre | |
|---|---|---|---|---|---|---|---|---|---|---|
| OATS. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Prize Cluster | 36 | 28 | 36 | 32 | 50 | 16 | 60 | 2 | 42 | 24 |
| Banner | 47 | 18 | 50 | 16 | 65 | 4 | 57 | 17 | 53 | 10 |
| Average of all varieties tested | 39 | 4 | 43 | 12 | 59 | 16 | 54 | 9 | 47 | 15 |
| BARLEY. | | | | | | | | | | |
| *Two-rowed sorts.* | | | | | | | | | | |
| Prize Prolific | 34 | 42 | 39 | 18 | .. | .. | 50 | 1 | 30 | 16 |
| Average of all varieties tested | 27 | 5 | 30 | 26 | 47 | 9 | 35 | 20 | 26 | 42 |
| *Six-rowed sorts.* | | | | | | | | | | |
| Baxter's six-rowed | 40 | 3 | 28 | 23 | 35 | 5 | 45 | 47 | 24 | 17 |
| Average of all varieties tested | 35 | 2 | 28 | 23 | 38 | 41 | 35 | 17 | 24 | 17 |
| Average of all barleys | 29 | 23 | 29 | 25 | 44 | 37 | 35 | 18 | 25 | 23 |
| WHEAT. | | | | | | | | | | |
| Red Fife | 10 | 31 | 14 | 14 | 29 | 55 | 25 | 14 | 25 | 53 |
| Campbell's White Chaff | 19 | 3 | 21 | 48 | 23 | 20 | 32 | 24 | 20 | 30 |
| Average of all wheats | 14 | 10 | 20 | 35 | 27 | 32 | 27 | 39 | 22 | 16 |

Average yields per acre on all the Experimental Farms combined.

OATS.

| | Bush. | Lbs. |
|---|---|---|
| Prize Cluster, average of 92 tests | 43 | 32 |
| Banner, average of 110 tests | 54 | 11 |

BARLEY.

*Two-rowed Sorts.*

| | | |
|---|---|---|
| Prize Prolific, average of 40 tests | 36 | 18 |
| Average of all varieties tested, 129 tests | 32 | 35 |

*Six-rowed Sorts.*

| | | |
|---|---|---|
| Baxter's six-rowed, average of 68 tests | 32 | 28 |
| Average of all varieties tested, 83 tests | 31 | 22 |

WHEAT.

| | | |
|---|---|---|
| Red Fife, average of 87 tests | 20 | 41 |
| Campbell's White Chaff, average of 81 tests. | 23 | 21 |

## Summary of all Tests.

In the following are included all the tests which have been made in all the week-apart sowings at all the Experimental Farms.

| | Bush. | Lbs. |
|---|---|---|
| Average of all varieties of Oats tested, 231 tests | 47 | 25 |
| Average of all varieties of Barley tested, 212 tests | 32 | 17 |
| Average of all varieties of Wheat tested, 220 tests | 21 | 38 |

It cannot be denied that many of the week-apart sownings which have been referred to in the foregoing pages, have given comparatively poor returns for the reason that the grain has been sown out of season. At the experimental farms in the eastern provinces, many of the plots have been sown too late, while at the western farms some have been sown too early. It does not seem too much to expect that intelligent farmers throughout the Dominion should raise crops equal to the average yields which have been had in these tests at the experimental farms, where many of the crops have been grown under such unfavourable conditions. The experimental farms are not model farms as to quality cf soil or productiveness, and there are many good farmers who, with better land, can and do raise heavier average crops than any produced on the experimental farms; but unfortunately many others fall far short of this, and the average crops of Canadian farmers, taking the country throughout, are not what they ought to be.

| | Oats. | | Barley. | | Wheat. | |
|---|---|---|---|---|---|---|
| | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| The census of 1891 gives the following as the average yields of grain per acre in 1890 for the whole Dominion | 20 | 00 | 19 | 46 | 15 | 40 |
| The official estimate of the crops for Ontario gives the average for the past 12 years as | 34 | 6 | 25 | 7 | 15 | 2 |
| The average of all the week-apart plots on all the Experimental Farms has been | 47 | 25 | 32 | 17 | 21 | 38 |

If the official returns of Ontario and the Dominion are correct, there must be large areas of cultivated land in the Provinces and Territories outside of Ontario which yield very small crops. In any case it is evident that there is much room for improvement. Serious reductions in yield may be avoided by sowing at the proper time, and important gains may be made by selecting for seed the best yielding sorts. The Prize Cluster and Banner are both excellent varieties of oats, but as shown in the results of all the tests reported here, conducted on all the experimental farms, when grown side by side for a series of years, the Banner has averaged 10 bushels and 13 lbs. per acre more than the Prize Cluster, while the latter has given nearly double the yield, which according to the census was the average return of the Canadian farmer in 1890.

When we take into consideration the large area of land under crop in Canada, a slight average increase makes a surprising total in the gain to the whole country. According to the census, the land occupied in Canada in 1890 by oats, wheat and barley, was 7,734,747 acres, divided as follows :—Oats, 4,129,769 ; wheat, 2,723,884, and barley, 881,894. The addition of a single bushel of oats per acre to the acreage given would, at 1 cent per lb., add nearly 1½ million dollars yearly to the income of Canadian farmers; a similar addition to the wheat crop would give another 1½ million ; and a bushel to the acre added to the barley crop would add half a million more. Canadian farmers cannot control the market price for grain, but there seems to be no doubt that they can, by sowing their grain at the most favourable periods, in each Province and Territory, and by the exercise of intelligence in the selection of the most prolific varieties for seed, add considerably to the annual yield.

That there is a general awakening among Canadian farmers, which augurs well for the future, is evidenced by an earnest desire for information bearing on their calling, while the great and growing demand on the experimental farms for pure samples of the best and most prolific sorts of seed grain, shows that the advantages which certain varieties offer in this respect, are becoming more generally appreciated.

# CENTRAL EXPERIMENTAL FARM.

:o:

DEPARTMENT OF AGRICULTURE,

OTTAWA, - - - CANADA.

:o:

**BULLETIN No. 22.**

:o:

# RASPBERRIES.

:o:

MARCH, 1895.

To the Honourable
The Minister of Agriculture.

SIR,—I have the honour to submit for your approval Bulletin No. 22, of the Experimental Farm series, on Raspberries, which has been prepared under my direction by Mr. John Craig, Horticulturist of the Central Experimental Farm.

The cultivated varieties of the Raspberry are much esteemed by the public generally and are growing constantly in favour. Within the past few years much attention has been given to the improvement of this fruit and many new sorts have been introduced, some of which have been originated in connection with the work of the Experimental Farms. The hardiness and quality of the leading varieties are discussed in this bulletin in the light of the experience gained at the Experimental Farm. The best methods of treatment are referred to and remedies suggested for some of the diseases to which this plant is subject.

It is hoped that the information given in this bulletin may encourage the growth of this fruit by farmers generally. Where land can be had, there is no reason why every household should not have an ample supply of this delicious fruit for several weeks during the warm summer weather, when such an addition to the diet is most agreeable and healthful.

The figures used in this bulletin have been engraved from photographs of clusters of berries grown on the Experimental Farm, and show the exact size of good samples of these fruits.

I have the honour to be
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farm.*

OTTAWA, March 22nd, 1895.

# RASPBERRIES

BY

JOHN CRAIG, Horticulturist.

The object of this bulletin is to bring before the farmers and fruit growers of Canada, some information regarding the cultivation of the raspberry, together with the experience gained during a period of five years, in testing a large number of varieties at the Central Experimental Farm.

Before going into cultural details it may be interesting to glance hastily at the sources from which our cultivated raspberries have been derived. They have been developed from three wild species. Their origin is clearly and concisely outlined by Prof. A. A. Crozier, in a recent bulletin published by the Michigan Agricultural College, as follows in speaking of :—" The wild red raspberry of Europe, our own wild red raspberry, and our native black cap. The first was known and apparently cultivated by the ancient Greeks, who traced its origin to Mount Ida, where it flourished wild, and from which it received its name, *Rubus Idæus*. Paladius, a Roman agricultural writer of the fourth century, mentions the raspberry as one of the cultivated fruits of his time. From the gardens of Southern Europe it found its way into France, the Low countries, and England, and from these sources into the United States. To this species belong the Red and White Antwerps, which have remained standards of excellence for upwards of a century, the Hudson River Antwerp, Franconia, and other similar varieties." These foreign sorts, though often abundant bearers of large, finely flavoured fruit, as Mr. Crozier further points out, have not proved adapted to the climatic conditions of the United States, and this is also true with regard to Canada, owing to a lack of hardiness and a liability to be injured by our hot summer suns. " These defects finally directed attention to our native raspberries. The black cap (*Rubus occidentalis*) seems to have been the first of these to have been brought into cultivation, and from the time of the earliest settlements we hear of the wild bushes being occasionally removed to the gardens." Prof. Macoun, of the Geological Survey of Canada, kindly furnishes the following particulars regarding the distribution of this species in Canada :—" *Rubus occidentalis* has a very restricted range both to the north and west. It is sparingly found in New Brunswick, quite common in Quebec, west of that city and through Ontario to Lake Huron, though apparently absent from Toronto westward to Lake Erie. On the west coast this species is replaced by one very like it named

*Rubus leucodermis*, which is common on Vancouver Island, and has been collected as far east as the Columbia River Valley, 100 miles south of Revelstoke.

In the east *R. strigosus* and *R. occidentalis* hybridize and form a species (?) named by Prof. Peck, *R. neglectus*. In the west *R. strigosus* and *R. leucodermis* form a hybrid which is far superior to *R. neglectus*. This form grows in abundance at Sicamous, B. C., close to the C. P. R. station, where it was found fruiting finely in July, 1889." *Rubus leucodermis* in its native state appears quite promising, but as yet has furnished no variety adapted to general cultivation.

"The first distinct variety of black cap (*Rubus occidentalis*) of which we have record, is the Ohio Everbearing, which attracted attention as early as 1832, from its habit of fruiting to a greater or less extent upon the young canes in autumn. For a family garden this was considered to be a desirable feature, though no varieties of this class ever found favour for market purposes. The yellow form of the black cap, represented by Golden Cap and other varieties, was introduced about the same time. The Doolittle next came into notice, about 1850, and attained considerable prominence." (Crozier).

In some districts of the United States black raspberries are extensively cultivated for drying, the "Ohio" being one of the favourite varieties grown for this purpose.

Our native red raspberry has a wider range than the black cap, extending especially much farther northward. Prof. Macoun also furnishes me with the following particulars regarding the distribution of this species :—"*Rubus strigosus* has a very wide range in Canada, passing without a break to the Coast Range in British Columbia. Mr. Low found it in Labrador on the height of land at the source of the Ungava River, down which it descends to Lat. 57°. Mr. J. B. Tyrrell brought back specimens from the "Barren Grounds" gathered in Lat. 62° 17′, Long. 103° 07′ West. Miss E. Taylor collected it in the delta of the Mackenzie River, on Peel's River, 30 miles north of the Arctic circle, and lastly Mr. James McEvoy gathered abundance of ripe fruit on the Yukon, north of Lat. 62°. I have gathered specimens in the mountains at an altitude of 7,000 feet. It will be seen by the above that it has a very wide range."

Mr. Crozier further states that "This species does not take so kindly to cultivation (as the black cap), and the origin of our varieties belonging to it is often obscure; we have but few well authenticated examples of the species in its purity having been brought from the wild state into cultivation, and most of these soon disappear. The evidence by which certain of our well known red varieties are assigned by botanists (doubtless correctly) to the native species is mainly structural, and not historical, since nearly all have originated, directly or by descent, as chance or artificial seedlings upon cultivated ground. That our native red raspberry has played a large and perhaps controlling part in the production of our most popu-

lar hardy red raspberries need not be denied, but the doubt which we are obliged to recognize on this point rests on circumstantial evidence too strong to be entirely overlooked."

The purple raspberry, of which we have such a notable example in "*Shaffer*," was first designated a distinct species, but recent investigations point to hybrid origin. This assumption appears to be well grounded, owing to the fact that nearly all hybrids between the black and the red raspberry produced here and elsewhere, have borne purple fruit, much resembling the "Shaffer" in colour and flavour as well as habit of growth. Prof. Saunders has probably fruited more true hybrids of this class than any other experimenter, the majority of which were intermediate in habit of growth and character of fruit. Their good points are vigour and productiveness; their weak points are the softness and acidity as well as unattractive colour of the fruit.

### Soil.

All varieties of *red raspberries* do not succeed equally well on the same kind of soil. For instance, varieties of foreign extraction (*Rubus idæus*), such as "Clark," "Hornet" and "Brinckle's Orange" do not flourish on sandy or light soils, but are more at home on a deep, rich, moist soil that is rather compact. On light soils their leaves are apt to burn in summer, which prevents the canes from maturing perfectly, and consequently renders them liable to injury by winter. For most varieties of raspberries a cool, loamy soil, moist, but not sodden, will usually give the best results.

The *black raspberry*, on the other hand, seems equally at home on sand or loam, and on well drained clayey soils; but on heavy compact soils which are cold, it does not thrive. Anyone who has attempted to grow black caps in cold and sodden soil will readily appreciate the truth of this statement. In ground of this kind the canes are subject to disease, are easily winter killed and prove generally unprofitable.

### Suitable Plants for Setting Out.

It is well to remember that the raspberry plant is a perennial in regard to its roots. The canes which are produced this year bear fruit the following summer, and die in the autumn of that year. Thus, although the roots are perennial the canes are biennial only, existing only for two years.

In the case of suckering kinds the best plants are obtained from the vigorous shoots of the previous year's growth. These may be taken up and set out either in the fall or in the spring; or during a rainy season the young sprouts may be transplanted successfully after the middle of June and up to the middle of July.

When fall planting is found convenient, it may be done usually with greatest success during the first half of September. Setting out at this time encourages immediate root growth, which assists in carrying

the plant through the winter and favours a vigorous growth in spring. All plants should be cut back within six or eight inches of the ground at the time of transplanting.

*Black caps*, known as "tip varieties," are multiplied by the tip bending down to the ground and striking root. This usually takes place after the fruiting season is over; in this latitude, from the middle of September to the middle of October. Propagation is facilitated by covering the tips of the canes with sufficient soil to hold them down.

Care should be exercised in planting these tips in order to prevent them from being set too deep, as if covered with more than two inches of soil they are apt to be smothered. In buying plants which have to be shipped some distance, it is usually best therefore to order one year old plants of the black caps instead of young "tips" which are more difficult to ship and transplant successfully. By taking this precaution a large percentage of failure will be avoided.

The stools or root clusters of both red and black raspberries may be taken up and divided in order to form a new plantation, but this method is not to be recommended, as old stools rarely make a vigorous growth, and much better results will be obtained by starting with young plants.

### Preparation of the Soil.

Labour spent in securing a thorough preparation of the soil, including deep ploughing and liberal manuring, will always repay the small fruit planter.

If the soil is light in character, it should be heavily dressed with barnyard manure in the spring, after being brought into a good state of tilth by growing on it a hoed crop the previous season. If of a clayey nature, it should be adequately drained, and the texture may be improved by ploughing under a green crop such as clover or peas.

Sub-soiling is not always absolutely necessary, but is always attended with good results, and should be practised when the under soil is hard and of a retentive character. In other cases where the surface soil is shallow and the underlying soil hard, unless it is loosened by means of a sub-soil plough, following the furrow of the ordinary turning plough, the roots will be unable to penetrate deep enough to obtain a sufficiency of moisture during periods of dry weather. In all gardening operations on a scale large enough to admit of its use, the sub-soil plough should be brought into play.

The necessary amount of hand labour involved in weeding subsequent to planting, will be greatly lessened by allowing no weeds to go to seed the previous year.

In brief, select when possible, deep, loamy, well drained soil; if this is not available bring the most desirable piece of ground into good condition by draining, sub-soiling and manuring. Raspberries, like strawberries, are not often, nor are they easily injured, by too heavy manuring, the error is generally on the other side.

## Planting, Cultivating and Pruning.

In field culture, suckering varieties, red, purple and yellow, should be planted in rows six to seven feet apart, and three feet apart in the row. The rows should be accurately measured and indicated by stakes previous to planting. The work of planting is much facilitated by carefully opening with a plough a furrow 4 or 5 inches deep in the line of the row for the reception of the plants. Two plants may be set in a hill, using a hoe to fill in the soil, which should be carefully compacted. Setting out two shoots to begin with, ensures a much better and evener growth in the whole field, than if a single cane is used in each case, and fewer failures will result if this plan is adopted. The cultivator, which should be started as soon as the planting is done, will effectually complete the filling of the furrow.

Black caps may be planted in rows in the same way. They are also successfully grown by planting in hills four or five feet apart each way. This method allows of very thorough cultivation by horse power, thus greatly lessening the amount of hand labour.

The canes of black raspberries should be cut back each season when they have reached a height of two, to two and a half feet ; unless treated in this way they are difficult to manage. This pinching back causes the plants to grow stocky and to throw out laterals. The laterals may be cut back to a length of 12 to 15 inches in the autumn ; but the best plan is to leave them till the following spring when the injured wood, if any, may be removed at the same time. The bearing wood should be removed as soon as the fruiting season is over. Experiments carried on here during the past two years, and still in progress, have not indicated any striking advantage from leaving the removal of the old wood till spring. There is generally more time to attend to this work in early autumn, than during the hurry of spring work.

Clean culture with all fruit crops always pays best. In the case of the raspberry, this is particularly true. Frequent shallow cultivation will keep down weeds, and preserve the moisture of the soil, often lacking during the season of fruit harvesting. A superfluous growth of suckers in the case of red raspberries, may be kept under by the cultivator and the vigor of the canes in the row thereby increased. Satisfactory results are also obtained by some growers, by mulching with straw or coarse manure instead of cultivating. With comparatively limited areas and situated within easy distance of a cheap manure supply, suburban gardeners can by mulching heavily in this way with strawy manure, grow a greater number of plants to the row, and obtain fruit of undiminished size. Some growers mulch the rows of plants only, leaving a strip in the centre of the inter space, which is kept clear of weeds by the horse cultivator. Weeds which appear in the rows are hoed out, or pulled by hand. Under ordinary conditions, when the plants are not thinned to something approaching a hill system, the fruit becomes small and the plants lose vigour.

The Illinois experiment station bulletin No. 30, reports the result of an experiment designed to show the benefit of cultivating the black raspberry throughout the summer, as against cultivation during the latter part of the season, after the fruit was picked. The experiment was carried on for four years, with the result that the area kept cultivated from early spring until fall, yielded 500 boxes more than the same area cultivated from the time the fruit was taken off, until fall.

### Training.

In this district, there are two principal methods of growing the red, yellow and purple raspberry, viz. : (1) growing tall canes which are bent over and covered in the autumn for better winter protection ; (2) growing shorter canes and thus increasing the likelihood of their being covered naturally, by snow fall.

Canes which are to be covered should be grown to a height of from 5 to 6 feet, this usually necessitates very little pinching back during summer. In the autumn or immediately after the fruit is picked, the old canes are thinned out, leaving four to six shoots in each hill ; the hills being about three feet apart. To bend down and cover these without fear of breaking them, a little earth is taken out on one side of the hill, the canes are then collected in a bunch, and pressed down in the line of row by means of a fork in the hands of one man, while sufficient earth is applied to the canes to hold them down by another man. The cost of the labour involved in covering an acre should not exceed $2.00. By this method larger and finer fruit may be obtained earlier in the season than without protection, and it is *par excellence*, the best method for the amateur. Some commercial growers in cold regions follow this practice successfully, while others do not find it satisfactory. In cultivating the suckering varities of the raspberry for market, it will depend somewhat on the situation and the varieties grown, whether it will pay the grower to adopt this plan or follow the next outlined.

The other method, that of keeping the plants low by summer pruning, is the one usually adopted. To carry this out properly, the canes should be pinched back when they have attained a height of from ten to fifteen inches (when the climate is not severe they may be grown taller as stated above). This will cause them to throw out laterals, which in turn should be pinched after making a growth of 12 or 15 inches. Sometimes this second pinching is deferred till the following spring. This system develops a very sturdy and stocky bush and one which is less liable to be injured by winter's cold—because usually covered by snow—than one grown by the former plan and left unprotected.

### Trellises or Supports.

It should be mentioned in connection with the first system—protecting in winter—that a trellis is necessary to support the canes after uncovering them in spring. Unless a trellis is used, mulching the ground

will be essential in order to keep the fruit from being soiled during rain and wind storms. A cheap trellis can be constructed with little trouble by using posts 5 feet long, made of 2 by 6 inch planks, and driving them edgewise across the rows, at distances of 3 to 4 rods apart. A single wire stapled to the outside of these posts will be sufficient to hold the canes in place, and prevent them from being borne to the ground by the weight of the fruit, or by rain or wind. Another plan is to use posts made of 2 x 4 inch scantling. Cross pieces 15 to 18 inches in length are nailed on the posts about three feet from the ground. The ends of the cross pieces are notched. The wire is nailed to the end posts of each row, and is held in place by the notches in the cross pieces into which it is laid. This method allows of the easy removal of the wire when desired.

In garden culture, it always pays to grow the canes in hills. Each hill should be supplied with a stake to which the canes may be tied. In brief, it may be stated that with winter protection, trellising or mulching is necessary. Without winter protection in the colder regions, growers run the risk of occasional injury to the plants, sometimes amounting to the loss of a crop, and besides are unable to grow the European varieties of raspberries with uniform success.

The following results were obtained from experiments planned with a view of testing the advantage and cost of protecting raspberries during winter by laying them down :—

1. The first effect was to hasten the ripening of varieties so treated, from 5 to 8 days.

2. With such hardy kinds as "Turner" and "Hansell" the increased productiveness and earliness did not more than repay the cost of such protection.

3. With varieties of the grade of hardiness of "Cuthbert", "Herstine", "Heebner", "Golden Queen", "Niagara", "Clark" and "Antwerp", productiveness was increased from 16 to 22 per cent. This, with the advantage of increased earliness, more than repaid the cost of protecting them.

The following tables of yields are given and estimated on the returns of the past season. They cannot be accepted as relatively accurate in all cases on account of the difference in the age of the plants making up the rows of the several varieties. In the case of the Black caps, the loss of a few plants in the row materially affected the result, as shown by the yield of Hilborn, usually a very productive variety. The severity of the winter injured the raspberries, thus considerably lessening the general yield.

SHOWING YIELDS OF PRINCIPAL VARIETIES OF RED RASPBERRIES IN 1893.

| Raspberries. — Red Varieties. | Date of First Picking | Date of Last Picking | Yield, in Boxes. | Length of Row, in feet. | Estimated Yield in Boxes, per acre. | Showing Injury from Winter '93 94. Scale, 1 - 10. | REMARKS. |
|---|---|---|---|---|---|---|---|
| Heebner | July 10 | July 30 | 73¼ | 350 | 1,302 | 9 | Rows well filled with plants. |
| Parnell | do 10 | do 28 | 55 | 350 | 978 | 9 | |
| Brandywine | do 10 | do 30 | 35½ | 350 | 630 | 9 | |
| Clarke | do 10 | do 30 | 32¾ | 350 | 578 | 5 | Suffered from winter. |
| Turner | do 10 | do 28 | 31 | 350 | 551 | 9 | |
| Niagara | do 10 | Aug. 4 | 29¼ | 350 | 520 | 7 | |
| Hansell | do 10 | July 28 | 26¾ | 350 | 474 | 7 | |
| Royal Church | do 10 | Aug. 4 | 23¾ | 350 | 422 | 4 | |
| Thompson's E'y. Prolific | do 10 | July 28 | 23¾ | 350 | 422 | 8 | |
| Marlboro | do 10 | do 25 | 23 | 350 | 410 | 7 | |
| Cuthbert | do 13 | Aug. 4 | 21½ | 350 | 381 | 5 | Rows not fully established. |
| Herstine | do 10 | do 4 | 20½ | 350 | 364 | 6 | |
| Reeder | do 10 | do 4 | 19¼ | 350 | 343 | 5 | |

SHOWING YIELD OF SOME OF THE NEWER VARIETIES OF BLACK CAP RASPBERRIES IN 1893.

| Raspberries. — Black Cap Varieties. | Date of First Picking | Date of Last Picking | Yield, in Boxes. | Length of Row, in feet. | Estimated Yield in Boxes, per acre. | Showing Injury from Winter '93-94. Scale, 1—10 | REMARKS. |
|---|---|---|---|---|---|---|---|
| Pioneer | July 11 | July 21 | 67½ | 175 | 2,400 | 9 | Two year old plants. |
| Older | do 10 | do 28 | 48½ | 175 | 1,724 | 10 | do do |
| Springfield | do 10 | do 28 | 16¼ | 59 | 1,714 | 4 | |
| Smith's Prolific | do 10 | do 21 | 8½ | 45 | 1,175 | 4 | |
| Palmer | do 10 | do 21 | 8 | 45 | 1,104 | 4 | |
| Ada | do 10 | do 21 | 4½ | 52 | 538 | 7 | |
| Hilborn | do 10 | do 25 | 24 | 350 | 427 | 9 | Rows not complete. |

It may be well to state here that raspberries are sometimes divided for convenience into two classes according to their methods of propagation.

1st. Upright varieties, increased by suckers from the roots, this including mainly our red and yellow sorts.

2nd. Drooping canes, rooting from tips, commonly called "tip varieties." These with one or two exceptions, bear fruit black or purple in colour. In the following descriptive list they are simply arranged in alphabetical order, the colour being indicated in each case. They have all been tested here; and the opinions expressed are based upon experience gained here, except where otherwise stated.

## VARIETIES.

Ada.—Black cap. Originated with Mr. H. M. Young of Ada, Ohio. Planted here in 1893, it made a fair growth. The fruit is of medium size, soft, of fair quality and ripens later than Gregg, which it almost equals in size. With two years' experience, it does not seem promising.

Beebe.—Yellow cap. Introduced from New York in 1886 under the name of *Beebe's Golden.* The canes have proved very tender and are easily broken by snow and the cultivator. The berry is one of the so-called yellow caps and is more curious than useful. After ripening, it soon turns a dingy orange brown, which renders it most unattractive.

Brandywine.—Red. Originated in Ohio about 20 years ago. In some sections it is highly thought of as a market berry. Here the canes have not been vigorous, while the berry is only of medium size, soft and of poor quality.

Baumforth.—Red. An English seedling raised by John Baumforth. Plants were received from W. W. Dunlop, Outremont, Que., in 1891. The cane is a weak grower, bearing large, dark red fairly fine berries of good quality. Season late. Needs high cultivation and winter protection.

Carter's Prolific.—Red. Planted spring of 1891. This has proved itself one of the most vigorous of the English varieties. The fruit is medium to large in size, conical, firm and of good flavour. The cane needs winter protection.

Carmen.—Red. Mr. A. A. Crozier describes Carmen as an early black cap. That variety fruited here for three years is a small red raspberry of the Hansell type. Neither appear to be valuable.

Chapman. —Black cap. Originated in the State of Ohio and said to be a synonym of the raspberry of that name. Here it appears to be distinct, having proved so tender as to kill out entirely the second year after planting.

Clarke.—Red. A large red berry belonging to the European type of berries. It originated with Mr. E. E. Clarke of New Haven, Conn., nearly 40 years ago. The plant is probably the most vigorous of the class to which it belongs. Fruit, large, dark red, conical, moderately firm; quality good. This variety should be grown for home use and might be profitably cultivated for select market purposes. It will pay to protect it in winter.

CUTHBERT.—Red. Mr. A. A. Crozier in his exhaustive descriptive catalogue of raspberries, says: This originated in the garden of Thomas Cuthbert, Esq., of Riverdale, New York, about 25 years ago.

Fig. 1. CUTHBERT.

It has been extensively planted since 1880. At the present time it is without doubt the most valuable red raspberry in cultivation. It is a strong, vigorous grower, and while not as hardy as Marlboro' or Turner, it is found adapted to a greater variety of soil and climatic conditions. Under conditions at all favourable to raspberry culture the results attained in growing this variety are mainly satisfactory. The fruit is of the largest size, conical, dark red, firm, not juicy, but of excellent quality. Season late. It does not ship as satisfactorily as Marlboro', but if handled carefully can be placed on the market in a presentable condition. At Ottawa, the expense involved in covering it, has been more than repaid by increased earliness and productiveness. It is the most reliable market sort grown, and is much esteemed for home use.

CAROLINE.—Yellow. Said to be the product of a cross between Brinckle's Orange and the Yellow cap, by S. P. Carpenter of New Rochelle, New York. The plant is a vigorous grower and among the hardiest of the red or yellow varieties. It is also exceedingly productive.

The berries are of medium size, dark orange yellow with a pleasant acidity. It is much too soft for a market variety, which is probably its weakest point. The canes have suffered considerably from cane rust or Anthracnose. Golden Queen is superseding this variety in the majority of commercial plantations.

Columbian.—Purple. Originated with Mr. J. T. Thompson of Oneida, N. Y., who says it is a seedling of Cuthbert, and supposes it to have been crossed with Gregg. Plants were obtained in the spring of 1893. They grew vigorously and fruited abundantly last season. In appearance of cane and habit of growth it much resembles Shaffer. The fruit also is much like that variety, with perhaps less acidity and more firmness. It has been reported favourably upon by the Rural New Yorker, the State Experiment Stations of New York and Michigan.

Champlain.—White. Originated with J. T. Macomber, Grand Isle Co., Vermont, from seed of White Antwerp. Plants obtained from Ellwanger & Barry in 1892. Cane moderately vigorous, not productive so far. Fruit medium size, light yellow or white, round, soft, juicy ; fine quality, fully equal to Brinckle's Orange. It may be valuable as an amateur variety.

Doolittle.—Black cap. Introduced by Mr. Doolittle of New York about 45 years ago. For a long time it was the leading black cap raspberry, but is now superseded by larger and more productive varieties.

Earhart.—Black cap. A so called ever-bearing variety. It may be of value in the milder portions of Ontario, where the season will admit of a second crop, which, under favourable circumstances, is usually borne before growth is checked by frost. In this locality the second crop produced on the young wood does not mature. The cane is not hardy.

Fastolff.—Red. An old English variety, which has been affected in a marked degree by Anthracnose or cane rust, and thus rendered quite unprofitable.

Fig. 2. Golden queen.

Golden Queen.—Yellow. Originated in New Jersey, and supposed to be a sport of Cuthbert, among plants of which variety it was found

growing. During the last ten years it has rapidly come to the front and now is the most esteemed of the yellow varieties for market purposes. In this locality it is not as vigorous as Cuthbert, and is more subject to cane rust. Productive. The berry is of good size, Cuthbert shape, but less firm. Quality good. Undoubtedly the best yellow berry now grown, for commercial purposes.

GLADSTONE.—Red. This undoubtedly belongs to the European type. Plants set out in the spring of 1892 have grown vigorously and borne fruit of medium size, dark red, conical, of good quality, but very soft; quite too soft for market purposes and not sufficiently productive. Last season it bore a small crop on the young wood.

Fig. 3. GREGG.

GREGG.—Black cap. This variety originated in Indiana about 30 years ago. It usually completes the raspberry season in time of ripening. It is also vigorous, productive, and ships well. It does not, however, rank as high in quality as 'Hilborn', nor does it equal that variety in hardiness, but is indispensable in the market gardener's list. Large quantities of this are now used in the evaporating industry.

Hansell.—Red. Originated as a chance seedling in Burlington Co., N.Y. This is one of the earliest of the red raspberries. It is hardy, but is only a slight improvement over the wild native sort. It bears well, but can scarcely be commended for general culture on account of lack of size and general appearance. The fruit is not equal to Rancocas in quality, but the season is extended over a longer period.

Heebner.—Red. Grown from seed of the wild raspberry found in Muskoka, propagated by W. W. Hilborn, Leamington, Ont. It resembles the European type much more closely than the American. Is a fair grower, moderately hardy, bearing large, dark red, roundish, highly flavoured fruit. During the past rainy season it has not set well. The quality is good to best, and very productive. The variety will probably be valuable for near market. It is not sufficiently firm to bear distant transportation. It has not yet been introduced.

Fig. 4. Hilborn.

Herstine.—Red. Originated with Mr. W. D. Herstine of Philadelphia. Cane fairly vigorous, but needs winter protection here. Fruit,

large, bright red, rather soft, productive; quality good. Ripens, medium to late. While of better quality than Heebner, on account of its lack of vigour and want of hardiness the Heebner is to be preferred.

HILBORN.—Black cap. (*See* Page 15). Named after the introducer, W. W. Hilborn, Leamington, Ontario, and said to be an accidental seedling. A medium early sort, of good quality and a heavy bearer. The cane is hardy but has been somewhat affected with 'Anthracnose.' This is an excellent berry for a near market, but is of special value to the amateur grower; it is also valuable for canning. "Older" will probably prove a strong competitor coming in as it does at the same season.

HIGHLAND HARDY.—Red. This variety has been popular in certain sections in New York State, chiefly on account of its earliness, but is now being superseded by Cuthbert and Marlboro'. It has been found here to be lacking in vigour. The fruit is too small to compete with other varieties now in cultivation.

HORNET.—Red. A French variety of large size and fine quality, but quite tender in this vicinity. Can only be grown in the colder sections by giving it winter protection, and then in a limited way.

KNEVETT'S.—Red. An English variety introduced many years ago. Planted here in 1892. Fairly vigorous, but much affected by leaf and cane rust. The fruit is of the largest size, round, dark red, rather soft; of good quality; ripens in mid-season. Not hardy. Not promising.

KENYON.—This was introduced by O. A. Kenyon of McGregor, Ia., as a chance seedling in 1885. Evidently belongs to the European type of raspberry, and does not seem to be entirely at home in this climate. The cane thus far is rather a weak grower, and the foliage liable to rust. Berry large, dark red, soft, of good quality; hardly promising here. In Iowa, Prof. Budd reports it hardy and promising.

LOUIS BONNE.—Imported from France by W. W. Dunlop of Montreal in 1892. The plant is a moderate grower with curious blackberry type of foliage. The fruit has been of no value on account of imperfect setting. A large proportion of the drupes fail to develop.

MAMMOTH CLUSTER.—Black cap. (*McCormick of the West*). Originated in Indiana many years ago. The cane is vigorous and productive, but is easily broken by snow and the force of wind. Up to the time that Gregg and Hilborn were introduced, it was the favourite mid-season black cap. The berry is softer and less attractive than Hilborn.

MARLBORO'.—Red. Originated with A. J. Caywood, of Marlboro', N.Y., the product of a cross between a hybrid and Highland Hardy. It was introduced in 1884. As a market variety it is now extensively grown; but, as a correspondent pointedly remarks, "the public have made a note of it and now want something as fine looking, but of better quality." It has proved itself, during the past trying season, to be a very reliable variety. In many situations it has withstood the winter's cold better than most other varieties. It is not a free grower and requires

high cultivation. Fruit, large, handsome, round, brilliant crimson, very

Fig. 5. Marlboro'.

firm ; quality, medium to poor. Season, among the earliest ; fairly productive.

Muskingum.—Purple. From Ohio. This is of the Shaffer type, but does not seem to be any improvement on that variety. It is a trifle firmer and somewhat smaller.

Niagara.—Red. Planted in 1888. Plant fairly vigorous and hardy ; very productive. Berries medium to large, round, dark red, moderately firm, pleasant acid, ripens with Marlboro'. A good many of the berries are imperfectly developed. This variety is worthy of trial.

Older.—Black cap. Said to have originated as a chance seedling in the garden of Mr. Older, of Independence, Iowa, it was first introduced in a small way by L. K. Ballard, of Warren, Ill., but in 1882 was offered to the trade by R. D. McGeehon, of Atlantic City, Iowa. It was planted on the Experimental Farm in the spring of 1892, and has given an abundant crop of berries the past two seasons. The cane is an exceedingly vigorous grower, is hardy and strikes from the tip very readily. Berries are large, round, dead black ; bloomless, with very large drupes. The seeds are not prominent, and the berries are borne in good sized clusters. It also has the habit of fruiting heavily on young wood. During the past season it

began to ripen with Hilborn and continued bearing until after the sea-

Fig. 6. OLDER.

son of Gregg had closed. From present experience this would seem to be a very profitable variety.

ORANGE. Yellow (*Brinckle's Orange*).—This variety, commonly accepted as a standard of excellence among raspberries, originated with Dr. D. W. Brinckle, of Philadelphia, about 50 years ago. The plant is a weak grower and very sensitive to cold. It cannot be grown satisfactorily in this vicinity without careful winter protection. The fruit is of a clear orange yellow colour, of fair size, but soft in texture. Quality, best.

OHIO.—Black cap. This is said to have originated in the State which bears its name. The cane is a hardy vigorous grower and very productive. The fruit ripens in mid-season and is of good quality, but the seeds are unpleasantly prominent. Mr. Crozier states that this

variety is grown in Western New York by the hundreds of acres "for evaporating purposes and for use in the fresh state." On account of its seediness it is particularly esteemed for drying.

Palmer.—Black cap. Originated with F. R. Palmer, of Mansfield, Ohio, and introduced in 1888. It was planted in 1892, and has proved moderately vigorous. It is one of the earliest varieties tried. The picking season is, however, very short, usually not extending over ten days. Fruit, medium size, glossy black, juicy, of good quality. Thus far it has been slightly more productive than Souhegan and Tyler. It is doubtful, however, that it will supersede these varieties in this locality. here. In 1893 it was quite promising, but the past season the later pickings were unsatisfactory.

Parnell.—Red. On somewhat cold soil the plant has proved a weak grower. Fruit, medium to large, conical, dark red, richly acid, texture soft, quality good. On good soil this would probably prove valuable for home use or near market.

Fig. 7. Pioneer.

Pioneer (*Progress*).—Black cap. This originated in New Jersey some years ago. It was offered to the public in 1889 by the Lovett Co., of New Jersey, under the name of "Progress." Plant, vigorous, but the canes are brittle and easily break down; propagates very readily. Fruit

ripens somewhat later than Tyler or Souhegan. It is of medium size, rather seedy and of fair quality. Worthy of trial.

RANCOCAS.—Red. Introduced by W. H. Moon, of Morrisville, Pa., in 1884. It is one of the earliest, as well as one of the hardiest varieties which we have in cultivation. It has not been productive here, and the fruit is too soft and too apt to crumble when picked, to merit special praise.

REEDER.—Red. Origin, a chance seedling found by Mr. Reeder, of Berien County, Michigan, 1875. Medium size, round, fair quality, moderately firm, a little earlier than Marlboro', but smaller, rather soft. The canes are also rather tender, and should always be covered in the autumn when grown in this locality.

ROYAL CHURCH.—Red. Thought to be a seedling of Herstine by the originator Mr. Royal Church, of Harrisonville, Ohio. Plant moderately vigorous and hardy, though not equal to Cuthbert in this respect; berry, medium to large, round, bright red with very large drupes which are inclined to break apart, making the fruit rather crumbly. Season, medium; quality, good. Not promising here as a market sort and not equal to other varieties for home use. In other localities it is highly spoken of.

SHAFFER—Purple. This valuable variety was found as a chance seedling on the farm of Mr. Shaffer in Munroe Co., N.Y., and introduced by Chas. A. Green, the nurseryman, in 1878. It is sometimes known as "Shaffer's Colossal." The plant is a fine strong grower, an immense bearer of large purple berries, which are rich and juicy, putting it at the head of the list of canning berries, at least for home use. Its dull colour and lack of firmness prevent it taking a high place as a market variety, but where well known it is highly appreciated. Mr. Wellington Boulter, Picton, Ont., however, does not use the Shaffer in his commercial canning establishment on account of the softness of the berry.

SUPERLATIVE.—Red. Belongs to the European type. Plant lacking in vigour and hardiness. Berry large, pointed, dark red, Cuthbert type in appearance, very soft, of good quality. This variety on rich soil with good cultivation and winter protection might be useful for home use.

SMITH'S PROLIFIC.—Black cap. Originated about ten years ago on the ground of Ezra G. Smith of Manchester, N. Y. Planted here in the spring of 1892. Cane, a rampant grower, but tender. Fruit rather larger and later than Hilborn; not so productive, but still a good cropper. It will receive further trial.

SMITH'S GIANT.—Black cap. Received from the originator, Mr. A. M. Smith of St. Catharines, Ont., in 1891. Plant, a strong grower, fairly hardy. Fruit, medium to large, of good quality, ripening somewhat earlier than Gregg. Mr. Smith claims it surpasses that variety in hardiness. On these grounds there has been little difference noticeable.

STAYMAN'S NO. 5.—Red. Since named *Olathe*. Originated with J. Stayman of Leavenworth, Kansas, from seed of Reliance. Cane,

hardy but a weak grower. Fruit, of medium size and quality. Not promising here, though spoken well of elsewhere.

Souhegan.—Black cap. Originated in New Hampshire from seed of Doolittle. It is the standard early black cap, but without high cultivation the berries become small and the canes soon die out.

Thompson's Early Prolific.—Red. A chance seedling introduced by the Cleveland Nursery Company, of Ohio, in 1888. It has proved a moderate grower, fairly hardy. Fruit firm, medium size, round, bright red ; quality, medium. It ripens here usually during the first week in July, but after one or two pickings the size rapidly diminishes. It does not seem to be much of an improvement on Hansell.

Thompson's Early Pride.—Red. Same source as last. As fruited here, not sufficiently distinct from the last to warrant a description, or sufficiently valuable for general cultivation.

Turner.—Originated 60 years ago by Prof. Turner, of Illinois. A very vigorous red raspberry, one of the hardiest of the class. Since the advent of the Cuthbert, its popularity has been waning. Fruit, medium size, pointed, crimson, lacking firmness, very juicy. It suckers very freely. For exposed situations this is a very valuable berry, but is not sufficiently firm for transportation. One or two instances of the impotence of this variety with its own pollen, have been brought to my notice, when it has been been planted on rich soil. In such situations it seems to have run largely to wood at the expense of fruitfulness.

Tyler.—Black cap. Originated in New York a few years after Souhegan. There is practically no difference between the fruit of these varieties. Tyler is perhaps a stronger grower and may succeed better under unfavourable circumstances.

## Seedling and Hybrid Raspberries.

Extensive experiments have been carried on in the work of originating and testing seedlings and hybrids since the spring of 1888. In this line of work this division was fortunate in securing the large number of valuable seedlings and hybrids grown and originated by Prof. Saunders, at London, Ont., prior to his connection with the Farm. A report on these seedlings by a committee of the Fruit Growers' Associations of Ontario and Quebec appears in the annual report of the Experimental Farms for 1890, page 100. The varieties then noted have since been carefully tested on a more extensive scale.

One variety not mentioned by the committee in this report for the reason that, being very late, it was not at its best during the time of their visit, has since shown so many points of excellence that it has been named and is now being propagated for distribution. It has been described as follows :—

Sarah.—(Record number 4–38.) Produced in London, Ont., by Prof. Saunders, from seed of Shaffer's Colossal. Plant a moderate grower, suckering freely, and propagating naturally only in this way.

The foliage seems to be intermediate between the European raspberry *Rubus Idæus* and the American *Rubus Strigosus*. The canes have been

Fig. 8. SARAH.

affected to some extent by anthracnose, but not more than Cuthbert or Marlboro' growing alongside. Fruit large, round; drupes large, deep garnet, firm, very juicy, pleasantly acid and exceptionally rich. See Fig. 6. A few ripe berries were seen last year, and this year, at the time of the first picking of Cuthbert, but the main crop did not ripen till the season of Cuthbert was over, the last picking taking place each year from the 8th to 12th August.

A striking characteristic of this variety is its habit of ripening the fruit in consecutive order and with much regularity, on the canes, beginning with the terminal clusters of each branch. Of course this habit is in a measure characteristic of all red raspberries, but none that I know of carry the peculiarity to the same extent.

With regard to the list reported on by the committee referred to, additional experience has in many instances modified opinions then expressed. Quite a number have proved more productive than named sorts: but the difficulty has been to secure a variety with fruit firm enough to answer the requirements of a market berry. Last spring the following varieties were chosen, named by Prof. Saunders, and a few plants of each sent to the Branch Farms for trial. They have all proved fairly productive. They will not be distributed till their usefulness has been satisfactorily demonstrated.

## RASPBERRIES.

| Record Number. | Name. | Origin. | Propagated by | Colour. | Size. | Texture. | Quality. | Season. | Plant. |
|---|---|---|---|---|---|---|---|---|---|
| 3–13 | Count | Seedling of Biggar's Seedling | Suckers | Red | Large | Moderately firm | Good | Early | Vigorous. |
| 5–41 | Citizen | Gregg X. Cuthbert | do | Purple | Medium | do | do | Mid-season | Fairly vigorous. |
| 3–11 | Carleton | Seedling of Biggar's Seedling | do | Red | do | Soft | do | Early | do |
| 3–39 | Craig | Unknown | do | Red | Large | Moderately firm | do | Mid-season | do |
| 5–42 | Duncan | Gregg X. Cuthbert | Suckers and tips | Purple | Large | do | do | Late | Vigorous. |
| 6–47 | Empire | Seedling of Biggar's Seedling | Suckers | Red | Large | Firm | do | Early | do |
| 3–21 | Garfield | do do | do | Red | do | do | do | Mid-season | Weak. |
| 3–52 | Garnet | Seedling of Philadelphia | do | Purple | Medium | Moderately firm | do | Late | Vigorous. |
| 3–8 | Lady Ann | Seedling of Biggar's Seedling | do | Yellow | do | do | Best | Mid-season | Weak. |
| 3–14 | Muriel | do do | do | Red | Large | do | Good | do | Vigorous. |
| 3–36 | Mary | Unknown | do | Red | do | do | Best | do | Weak. |
| 3–17 | Sharpe | Seedling of Biggar's Seedling | do | Red | do | Firm | Good | Early | Vigorous. |
| 6–34 | Sir John | do do | do | Red | do | Soft | do | do | do |
| 8–72 | Trusty | Unknown | do | Red | Medium | Firm | do | Late | do |

## DISEASES.

A serious disease affecting both the red and black cap raspberries, as well as blackberries, has appeared in most parts of the country to a greater or less extent during the last 8 or 10 years. This is called "Anthracnose" or "Raspberry Cane Rust" (*Glœsporium venetum*).

*a* *Enlarged pit and summer spores.* *b* *Affected cane.*

Fig. 9. ANTHRACNOSE—GLŒSPORIUM VENETUM.

It appears as brown or grayish blotches or pits upon the young shoots, petioles, leaves and stems, soon after they have attained a height of 12 or 15 inches. The ill effects of the disease are more apparent on two year old or bearing wood, than up on the summer sprouts. The effect is seen in the shrivelling of the fruit before maturity. The blotches enlarge as the

season advances, increasing in size to such an extent as to encircle the stem. All the growing parts of the plant thus being affected, the cane usually withers and dies before fruiting.

Diseased plants have small buds and unhealthy looking leaves. The vegetative portion of the fungus penetrates the intercellular spaces of the host plant and robs it of its food material. The disease reproduces itself by means of summer spores which are distributed by natural agencies, and it is probably carried through the winter by means of the vegetative portion or mycelium of the fungus, which is supposed to be of a perennial character.

In the case of the black raspberry the characteristic blotches very often appear first at the base of the cane. The same general effect then follows as in the case of the red raspberry.

## TREATMENT.

Experiments in treating this disease by spraying with Bordeaux mixture have been carried on during the last two or three years. It cannot be said to yield readily to this treatment, although it may be kept in check by spraying faithfully.

Prof. Green, of the Ohio Experiment Station, publishes the results of successful experiments in treating this disease and gives instruction for its treatment by spraying with Bordeaux mixture as follows:—

"The first application should be made early in the spring before the leaves open, at which time the spraying should be very thoroughly done. The second application should be made soon after the young canes appear above ground, and the spray directed to them alone. The third application is to be made about two weeks from the date of the second, taking the same precaution to spray the young canes principally. The fourth and last application should be made just previous to the time of blooming, in the same manner as advised for the second and third sprayings. Raspberry leaves are very tender, and the mixture may injure them slightly, but not enough to preclude its use, especially if some care is taken to keep it off the leaves of the bearing canes. The leaves on the young shoots of the current season's growth are not so easily harmed, hence no pains need be taken to keep it off them."

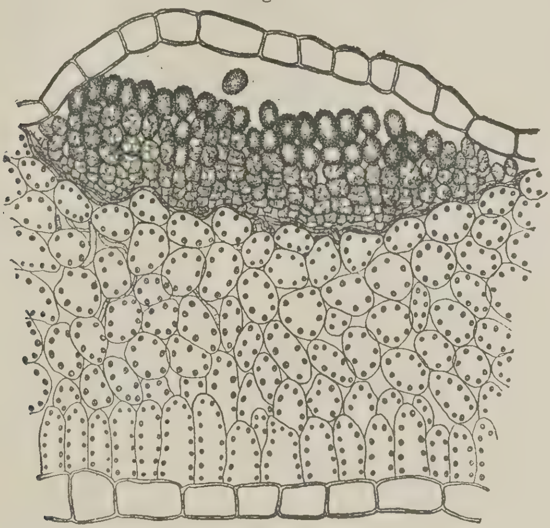
Mr. Green also reports good results from the use of ammoniacal copper carbonate solution, stating that it can be used "with even less harm to the foliage, but, all things considered, the dilute Bordeaux mixture is preferred." It is advisable to cut out and burn all fruiting canes each summer as soon as the crop is gathered.

### Orange Rust.

Another troublesome disease affecting blackberries, however, more than raspberries is known as the "Orange Rust," (*Cæoma nitens*). The following description of the disease is given by Dr. Clarence M. Weed, in his work on "Fungi and Fungicides."

"The disease becomes noticeable as soon as the foliage expands in spring, affected leaves having a peculiar golden colour, which at once distinguishes them. A little later the surface becomes more or less covered with small round patches of orange-coloured spores, to which the common name is due. The life-history of the fungus has only recently been definitely worked out.

Fig. 10.



a

*Section of Blackberry leaf showing development of orange rust spores, magnified.*

b

*Raspberry leaf affected by orange rust.*

c

*Blackberry leaf affected by orange rust.*

"The fungus exists on the blackberry plant in two very different stages. The orange spores that are developed in spring and early summer, as shown in Fig. 10, belong to the *æcidium* stage. [The above illustration

has been kindly loaned by the Ohio Experiment Station.] They germinate on the leaves of the raspberry and blackberry; the germinating tubes enter the stomata or breathing pores of the leaf, develop a mycelium inside and finally produce on the surface, the spores of the *teleuto* stage, which had heretofore been considered an entirely different fungus, called by botanists *Puccinia peckiana.* These Puccinia spores are believed to be washed down to the underground shoots, and to infect them with the mycelium, which subsequently produces the orange spores of spring. Blackberries are most commonly affected by this fungus, especially certain varieties, but black cap raspberries often suffer also.

## TREATMENT.

"All diseased canes should be cut out and burned as soon as they show signs of disease. Insist on your neighbours keeping the rust in check, and also look out for wild plants that have it. A spraying with fungicides will doubtless assist in preventing infection, especially of the Puccinia stage."

### Select List of Raspberries for Garden Culture.

Yellow—Brinckle's Orange, Golden Queen.
Red—Heebner, Cuthbert.
Black—Older, Gregg.
Purple—Shaffer.

### List for Commercial Purposes.

Yellow—Golden Queen.
Red—Hansell, Marlboro', Cuthbert.
Black—Older, Hilborn, Gregg.
Purple—Shaffer (for near market).

# CENTRAL EXPERIMENTAL FARM.

## DEPARTMENT OF AGRICULTURE

OTTAWA, - - - - - CANADA.

## BULLETIN No. 23.

1. SPRAYING FOR THE PREVENTION OF FUNGOUS DISEASES.
2. INJURIOUS INSECTS.
3. POTATO BLIGHTS.
4. BLACK KNOT OF THE PLUM AND CHERRY.

APRIL, 1895.

PUBLISHED BY DIRECTION OF THE HON. A. R. ANGERS, MINISTER OF AGRICULTURE.

To the Honourable
The Minister of Agriculture.

SIR,—I beg to submit for your approval Bulletin No. 23 of the Experimental Farm series which has been prepared under my direction by Mr. James Fletcher, Botanist and Entomologist, and by Mr. John Craig, Horticulturist.

During 1894 it was deemed advisable in order to meet some pressing demands for information in certain districts, to issue, in limited editions, circulars and "Experimental Farm Notes" containing matter bearing on the subjects treated of in this bulletin. These publications were sent to the press and to persons residing in those districts where the information they contained, was most urgently needed. Further experience has since been obtained on these topics, and as the subjects treated of are of general interest, the additional facts gained, together with those contained in the circulars and "Notes" referred to, have now been brought together and condensed in Bulletin 23 which will be distributed in the usual manner, to all those whose names are on the mailing lists of the Experimental Farm.

In the part written by the Botanist and Entomologist, a few of the most injurious and destructive insects are treated of, such as the fruit grower can best deal with during the spring months by the timely use of the insecticides recommended. The principal diseases to which the potato is subject, are also explained and the best remedies given.

In the part written by the Horticulturist, the question of spraying fruit trees and vines for the prevention and destruction of those fungous diseases which are so detrimental to fruit growing, is discussed and the best methods of treatment explained. The life history of the "Black Knot" of the Plum and Cherry is also given and remedies recommended.

This bulletin is issued with the hope that it will be of service to fruit growers and farmers generally throughout the Dominion.

I have the honour to be
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, April 1st, 1895.

# SPRAYING FOR THE PREVENTION

OF

# FUNGOUS DISEASES.

BY JOHN CRAIG, *Horticulturist.*

This bulletin is issued in response to the growing demand by fruit growers and farmers, for definite and concise information with regard to the practice of spraying, for the prevention of diseases injurious to the fruit-bearing trees and plants of the orchard and garden.

The results of experimental work upon this subject have been given annually by this Division either in the report of the Experimental Farms, or in circular form, since bulletin No. 10 was issued in April, 1891. Each year has marked an increase of interest in spraying, has furnished additional evidence of its value, and has shown conclusively that the fruit grower of to-day must include spraying in the routine of his yearly round of operations, if he would secure the largest returns possible, in addition to having healthy and vigorous trees. In fact, no line of work associated with the successful culture of fruits at the present time is charged with greater interest to the Horticulturist than the subject under consideration. It is also true that there are few, if any, of the operations now included in the annual programme of the fruit grower, whose success is more dependent upon conditions practically outside the control of the operator than is spraying. Meteorological conditions, as rain and wind, heat and cold, have a marked influence on the results, and are often the means of discouraging a beginner, and of preventing him from carrying out good resolutions formed at the beginning of the year. An unfavourable season may, occasionally, so mar the effect of conscientious effort as to place in doubt the beneficial results, and sometimes shake the confidence of the novice, in the efficacy of the remedies recommended.

It must not be taken for granted, on account of the importance of the practice of spraying as set forth in the various publications of this division, that it is offered to the fruit grower as a universal panacea for all phases of ill-health and non-productiveness affecting fruit trees. It should rather be viewed by the orchardist in the light of an additional weapon, assisted by good cultivation and liberal feeding, with which to ward off injurious enemies. Good cultivation,—meaning thorough tillage of orchards,—with an abundance of plant food, undoubtedly does much towards lessening the amount of diseases affecting plants, by making them vigorous and healthy, and thus resistant to parasitic attacks.

Fungous diseases, however, in accordance with natural laws, will in all probability increase in number, in proportion as the food plants upon which they prey, are multiplied, and as climatic conditions are favourable to their development.

In order, in this age of keen competition, to obtain from a given area the largest possible product of the highest quality, the best means of preventing injury from these pests must be adopted. After giving good cultivation, spraying, therefore, must be resorted to in order to secure this result. If we would derive the greatest benefit, it should be generally practised. The value of the efforts of one man who faithfully sprays his orchard, is greatly lessened if his neighbour neglects this preventive measure, and so allows his orchard to serve the purpose of a breeding ground for the spores of fungous diseases, of which we have such well marked examples in the "scab" of the apple and pear.

## NATURE OF FUNGI.

A brief consideration of the principles underlying the practice of spraying, may enable the grower to understand the nature of fungous diseases, and this will be of service in directing an intelligent application of the remedies which are recommended. A glance at the character and habits of parasitic fungi will throw light upon the system of treatment.

The word *fungi* is used to designate an exceedingly numerous class of plants of simple organization ; we must never lose sight of the fact that they belong to the vegetable world and are therefore subject to the ordinary conditions of plant life. Some of them derive their nourishment from living plants or animals, others from dead plants or animals. Those which draw their food from other plants more highly organized than themselves, are termed parasites, and it is with this class that the fruit grower is chiefly concerned. These plants (parasitic fungi) have not the power of assimilating food from the soil or atmosphere, and therefore must obtain it in a prepared condition through the agency of the higher plants upon which they feed. The vegetative part of a fungus—that part corresponding to the root, stem and leaves of the higher plants—is made up of delicate thread-like tubes, usually more or less matted together ; these collectively are termed *mycelium*. The term *hypha* is applied to a single thread-like tube. Parasitic fungi bear no seeds or flowers, but are reproduced by spores which are borne upon specialized branches of the hyphæ. These spores are produced in great numbers and are the principal, though not the only, means of spreading disease. The hyphæ-threads of the parasitic fungi penetrate the tissues of the host plant—a name applied to the plant upon which they feed.

The spores are exeeedingly light and easily carried by currents of air. When one falls upon a leaf and is supplied with moisture, it germinates by sending out a slender tube, which effects an entrance into the tissues of the leaf through the breathing pores (stomata), or intercellular spaces. After the parasitic fungus has thus entered the interior

of a leaf, it developes rapidly at the expense of the tissues of the latter. Pushing forward from one cell to another, the contents are appropriated and fresh vigour is thus gained by the parasite. This goes on till the vigour of the host plant is much impaired, or its life destroyed. Some of the principal parasitic diseases attack both foliage and the fruit of the host plant, as in the case of the "mildew" of the grape, "scab" of the apple and pear, and "rot" of the plum and peach. They are thus doubly destructive. If this destruction were confined to a few cells, leaves, or even to a few plants, the loss would be trifling; but the extraordinary rapidity with which fungi multiply, and the ease with which their reproductive bodies (spores) are carried from plant to plant, renders their extirpation a very difficult matter.

This explanation of the methods of reproduction and growth of these diseases emphasizes the truth of the maxim that "prevention is better than cure." When the mycelium of the fungus has become established within the tissues of the host plant, any remedy applied to the exterior of the plant, it is readily seen, can at the best be only partially effective. The copper salts have long been known to possess valuable germicidal properties. One of the commonest and cheapest of them, copper sulphate (blue-stone) has been used for many years to kill the spores of smut infesting seed wheat. *Bordeaux mixture*, which is composed of blue-stone, dissolved in water, combined with lime, has proved to be the most effective and the cheapest preventive agent yet discovered. A very concentrated mixture was used at first, which was difficult to apply and rather expensive. This has now been abandoned for weaker mixtures as hereafter explained.

## EXPERIMENTAL WORK.

In the spring of 1890, the first year of the appointment of the writer as Horticulturist to the Central Experimental Farm, Ottawa, experiments were planned and carried out in orchards at Abbotsford, Quebec. The experiments were designed to show the benefit of spraying with ammoniacal copper carbonate in varying proportions, copper sulphate of varying strength, as well as the value of other fungicides. The variety of apple treated was Fameuse, and the results gained demonstrated the profit of spraying with *ammoniacal copper carbonate*, of the strength since recommended by the Horticultural Division of the Experimental Farm. Experiments have been continued each year up to the present, all marked with more or less success according to the character of the season. In the initial stages of this work, the important questions of economy and ease of application, in addition to the effectiveness of each mixture, had to be studied by the experimenter so that a remedy when discovered might be practicable and thus commend itself generally to the public.

These experiments have covered the trial of over thirty spraying mixtures, and among the fruits included were apple, pear, plum, cherry, peach, and the majority of the small fruits.

Owing to the difficulty of applying and the cost of making the concentrated Bordeaux mixture as first prepared, many other copper salt compounds have been tested, with the result that many were discarded, while a few were recommended for trial. Copper sulphate, or bluestone, having entered into all mixtures giving favourable results, the number of formulæ recommended has gradually lessened with each year's experience, till at the present time the fruit grower needs not burden his mind with a bewildering array of receipts or formulæ, almost as numerous as the legion of enemies which attack his orchards and vineyards.

As a result of experiments conducted in 1892, the writer recommended a modified formula for the preparation of *Bordeaux mixture.* This was given to the public by means of a bulletin and by circulars issued during 1892 and 1893. Prof. Green of the Ohio Experimental Station also recommends this formula. The formula is as follows:—4 pounds of copper sulphate, 4 pounds of lime and 50 gallons of water. The cost of this need not exceed one-half cent per gallon, and it admits of the addition and application of Paris green at the same time. *Ammoniacal copper carbonate* was also recommended at that time. This will not be used as freely as Bordeaux mixture on account of its greater cost and the increased labour of preparing it. For spraying late in the season, when stains on the fruit are undesirable, copper carbonate is the most useful agent yet discovered. In copper sulphate we have the base or foundation of both the above mixtures, and a very effective fungicide to apply *before the foliage appears.* With this trio, backed up by intelligence and perseverance, the fruit grower may largely increase the revenue derived from his orchard.

As the treatment is entirely preventive, in order to make spraying effective it must be commenced early. All parts of trees or plants, must be reached with the preventive agent. Drenching is not necessary and is expensive. A thin film or coating of the fungicide deposited upon the foliage in the form of a misty spray will prevent the development of the spores better than a complete soaking which will run off like a shower of rain; but it is important that all the leafy surface should be well covered, and on this thoroughness of the work will depend the ultimate success of the undertaking.

## SPRAYING MIXTURES.

The following fungicides are those which experience leads me to recommend:—

Copper sulphate........................ 1 lb.
Water.................................25 gallons.

This should be used *only before* the foliage appears. It is easily applied and acts as a general germicide and disinfectant. In simple solution Copper Sulphate is very injurious to foliage. When lime is added as in making Bordeaux mixture, its corrosive action is neutralized and injury to the foliage prevented. In this way a larger quantity of blue-stone may be used, and it adheres to the foliage better by the agency of the lime.

## DILUTED BORDEAUX MIXTURE.

The ingredients are copper sulphate, lime and water, in the following proportions :—

| | |
|---|---|
| Copper sulphate............ | 4 lbs. |
| Lime...................... | 4 lbs. |
| Water............... .... | 50 gals. or one kerosene barrel. |

To destroy leaf-eating insects, add 4 oz. of Paris green. For peaches use 3 lbs. each copper sulphate and lime and 3 oz. of Paris green, on account of the tenderness of the foliage.

When a single barrelful of Bordeaux mixture is required, dissolve in a coal-oil barrel partly filled with water 4 lbs. of copper sulphate (bluestone). Hot water facilitates the operation. To dissolve quickly place the copper sulphate in a cotton bag or basket, and suspend this in the vessel containing the water so that it is entirely immersed. Solution rapidly takes place. In another vessel slake 4 lbs. of fresh lime with as many gallons of water. If the lime when slaked is lumpy or granular, it should be strained through a fine sieve or coarse sacking, into the barrel containing the copper sulphate now in solution, then fill the barrel with water and it is ready for use. It should be used soon after being prepared.

When a large amount of spraying is contemplated, it is a good plan to make stock solutions separately, of lime and blue-stone, which can be diluted as needed :—Dissolve 100 lbs. of copper sulphate in 50 gallons of water ; two gallons when dissolved will contain 4 lbs. of the salt. In another barrel slake 100 lbs. of lime and make up to a milk by adding 50 gallons of water ; when well stirred two gallons should contain 4 lbs. of lime. When as before, it is desired to make a barrel of Bordeaux Mixture, take two gallons of the stock solution of copper sulphate, and add the same quantity of the milk of lime ; if the lime is of good quality, it will be sufficient in order to neutralize it completely. If the lime is air-slaked or impure, the right quantity can be ascertained by applying the ferro-cyanide of potassium test. A two-ounce bottle containing a saturated solution of ferro-cyanide of potassium costing five cents is all that is required for a season's work. If the lime is deficient, a drop of the ferro-cyanide of potassium (yellow prussiate of potash) added to the mixture will turn brown. Add the milk of lime till the drop of ferro-cyanide of potassium remains colourless. Then add a little more milk of lime to make sure that the strength is uniform, and fill the barrel with water.

### Ammoniacal Copper Carbonate.

| | |
|---|---|
| Copper Carbonate.......................... | 5 oz. |
| Ammonia .. ............................ | 2 qts. |
| Water...................... .... ...... | 50 gals. |

This is prepared by dissolving the copper carbonate in the ammonia, and diluting with water to 50 gallons. The concentrated solution should be poured into the water. Care should be taken to keep the ammonia in glass or stone jars tightly corked.

This mixture is more expensive than the former, but is more easily applied and may be used as a substitute, especially in the case of grapes, cherries or plums, where late spraying is necessary, and when Bordeaux mixture might, by adhering to the fruit, injure its sale.

## HOME MANUFACTURE OF COPPER CARBONATE.

As the precipitated form of Carbonate of Copper is not always obtainable from druggists, and, unless freshly precipitated, may not be readily soluble, the following directions are given, for the easy preparation of this material at a cost much less than the usual wholesale price.

In a vessel capable of holding two or three gallons, dissolve $1\frac{1}{2}$ pounds of copper sulphate (blue vitriol) in 2 quarts of hot water, using the crystalline form. This will entirely dissolve in fifteen or twenty minutes. In another vessel dissolve $1\frac{3}{4}$ pounds of sal soda (washing soda), also in 2 quarts of hot water. When completely dissolved, pour the second into the first, stirring briskly. When effervescence has ceased, fill the vessel with water, and stir thoroughly; then allow it to stand five or six hours, when the sediment (called the precipitate) will have settled to the bottom. Pour off the clear liquid without disturbing the precipitate, fill with water again, and stir as before; then allow it to stand until the sediment has settled again, which will take place in a few hours. Pour the clear liquid off carefully as before, and the residue is *carbonate of copper*. Using the above quantities of Copper Sulphate and sal soda, there will be formed 12 ounces of copper carbonate.

Instead of drying this, which is a tedious operation, add four quarts of strong ammonia, stirring in well; then add sufficient water to bring the whole quantity up to 6 quarts. This can be kept in an ordinary two-gallon stone jar, which should be closely corked.

Each quart will contain 2 ounces of the carbonate of copper, which, when added to 20 gallons of water, will furnish a solution for spraying, of the same strength and character as that obtained by the use of the dried carbonate, and one which can be prepared with little labour, and kept ready for use throughout the season.

## EQUIPMENTS FOR SPRAYING.

The necessity of spraying as an annual practice has created a demand for suitable appliances. Many kinds of hand and horse power pumps, specially designed for this purpose, are now to be found upon the market. Up to a comparatively recent period there were no spraying pumps of Canadian manufacture offered to the public. I do not know of any horse power pump being manufactured in Canada at the present time, but there are a number of strong force pumps now available, and lack of suitable machinery can no longer be urged as a reason for not spraying.

There are three principal classes of sprayers besides the small hand pumps suitable to limited garden areas: 1. Knapsack, 2. Force

pump, fitted in a barrel, 3. Force pump, fitted in a tank mounted on wheels and operated by power derived from the motion of the wheel.

1. *Knapsack sprayers* ; as may be inferred, are designed to be carried on the back, and are copper tanks holding from four to six gallons of liquid, each supplied with a force pump. The pump handle should be adjustable so as to allow of its being worked by either hand. To prevent clogging, the discharge pipe should enter the tank at the top. The price of these varies from $10 to $15. Tanks made of galvanized iron or tin, while much cheaper and useful for applying Paris green or other insecticides, will soon become corroded if they are used to apply Bordeaux mixture. For small areas, fruit gardens, or when the ground is rough and uneven the knapsack sprayer is exceedingly useful ; at the same time, the work of carrying this tank is neither easy nor agreeable.

2. *Force Pumps, fitted in Barrels.*—This style of pump will meet the requirements of the majority of fruit growers. Secure a coal oil barrel and a good strong force pump. The valves, working parts and linings should be of brass, which will resist the corroding action of the copper salts much longer than iron. The metal chambers and all castings should be strong and heavy and the packing of the most durable character. In some respects displacement and rotary pumps have certain advantages over suction pumps in this respect. Nothing is more annoying and nothing acts more as a deterrent to the introduction of the practice of spraying, than the "breakdowns" which sometimes occur with irritating frequency at the beginning of the work each year. More durable pumps than were formerly procurable are now being made in Canada, and a list of Canadian manufacturers, as far as known at present, is subjoined.

The force pump is firmly fitted to the end or side of a barrel, as convenience may suggest. It should be supplied with two lines of hose, the lengths proportionate to the height of the trees, and each fitted with a stop-cock and nozzle. In case of clogging, the stop-cock will always be appreciated. In spraying tall trees, a bamboo pole through which is inserted a ⅜-inch brass tube, is to be recommended. This is also supplied with a stop-cock and is very useful in elevating the nozzle ; the extension may be from 6 to 10 feet long. A gas pipe of the same length may be substituted for the bamboo, or an equal length of hose employed and the nozzle elevated by means of a pole ; but the better the appliances one has, the more thoroughly the work will be done, and, therefore, the more decisive the results obtained.

3. *Power Pumps.*—The power which operates the pump in these machines is usually derived by means of chain and sprocket-wheel, from the revolving wheel of the carriage upon which the tank is mounted. For extensive orchards, vineyards and potato fields, some form of power sprayer will be found most economical. The only one with which I have had personal experience, is the "New Victor," manufactured by the Field Force Pump Co., of Lockport, N.Y., U.S. This was used last year

with a fair degree of satisfaction in the orchards of the Central Farm. In purchasing a power machine, the buyer should see that the castings and working parts are strong and perfect. It is also advisable to secure extras or duplicates of those parts which are most likely to give out. Before purchasing a pump or sprayer, the grower should also carefully study his needs and conditions. If his orchard ground is rough and uneven, or apt to be soft in spring, a power pump, may not be as suitable as a barrel pump mounted upon a stoneboat or wagon.

Home-made sprayers are frequently found to be more serviceable and better adapted to existing conditions than any that can be found in the market. Some large orchardists use home-made box-like tanks, the length of a wagon box, holding 200 to 250 gallons, supplied with hand force pumps, and claim for them superior durability. The motion of the wagon assists the agitator in keeping the liquid stirred, but it is somewhat doubtful whether it can be successfully agitated in this way, owing to the form of the tank operating against the work of the agitator.

## AGITATORS.

It is important that all spraying liquids should be kept thoroughly stirred while being applied, in order to maintain a uniform strength and to prevent the clogging of the nozzle. Most force pumps are supplied with a return discharge pipe to stir the liquid. As a general rule, these are unsatisfactory and inadequate. There are few pumps, if any, which possess sufficient power to throw a desirable spray and stir the liquid at the same time by means of a return stream. A mechanical agitator, operated by an attachment to the pump handle, will usually be found more satisfactory than any other stirring device. The agitator in most of the power machines now upon the market is usually a weak point. The liquid should always be well stirred by hand or some other means, before beginning to spray.

## NOZZLES.

The distributing agent is one of the most important parts of the spraying outfit. The nozzle should throw a fine spray and thus be economical of fluid, and also be easily freed from any substance which may clog the passage.

In the experiments of the past year, the nozzles which gave greatest satisfaction were the "Vermorel" and the "McGowen." The former uses a minimum amount of liquid, and may be used with the greatest advantage where the trees are small, or upon the lower branches of large trees. Of course, it may be elevated with a pole, bamboo or gas pipe extension. The McGowen is a valuable instrument for carrying the fluid to the upper branches with a minimum degree of waste. It is a great mistake to use for spraying purposes such instruments as the "Boss" and "Graduating" nozzles. They are useful for watering lawns, but are entirely out of place in an orchard. Trees should be sprayed, not drenched.

Small hand pumps are often very useful for limited garden areas, where they will serve the purpose as well as the more expensive knapsack pumps.

Advertisements of spraying materials and apparatus are now found in the leading agricultural and horticultural journals, and particularly in the *Canadian Horticulturist*, published at Grimsby, Ont.

## PUMP MANUFACTURERS.

The following firms are manufacturers of spraying pumps, samples of which they have kindly forwarded to the Experimental Farm for trial, and which, in the main, have given satisfaction :

Holmes & Holladay, Clarksburg, Ont. ;
Goold, Shapley, Muir Co., Brantford, Ont. ;
Ontario Pump Co., Toronto, Ont.

In addition to the above, pumps are manufactured by J. W. Anderson, Barrie, Ont., and The Parker Excelsior Spray Pump Co., London, Ont.

They can also be obtained through the leading seedsmen of the Dominion.

Pumps of various kinds have also been kindly forwarded for trial from the following firms in the United States : Field Force Pump Co., of Lockport, N.Y., M. B. Brooks, Novelty Works, Oak Point, N.Y., and P. C. Lewis, Catskill, N.Y.

## DISEASES PREVENTED AND PROFITS OF SPRAYING.

As already stated, experimental work along this line has been going on for some years at the Experimental Farm, with results each year corroborative of the effectiveness of spraying. By means of the experiments planned and carried out in conjunction with the Fruit Growers' Association of Ontario, during the past season, by authorization of the Minister of Agriculture for the Dominion, the value of the work has received such emphatic confirmation that the resulting impetus will place the utility of the practice of spraying to lessen fungous injury, as well as insect attacks, on a plane well out of the reach of controversy.

These experiments were designed to show (1) the practicability of the remedies recommended for the prevention of fungous diseases and (2) to furnish to fruit growers instructive and convincing object lessons of the benefits of spraying.

The following is a brief statement of the most important results obtained as stated in the Report of the Horticulturist for 1894 :—

The unprecedented and continuous rains which visited southern Ontario during May and June of last year, coupled with the scorching heat and drought of mid-summer, combined to form a season with conditions most unfavourable to obtaining even average results. Never to my knowledge have apple trees—foliage and fruit—suffered so severely from the *apple spot fungus*. The disease coming before the fruit had much more than formed, attacked the foliage so severely as to cause it

to resemble and be easily mistaken for the ordinary "twig blight." Most varieties lost a large proportion of their leaves, which of course resulted in a corresponding loss of the fruit. This visitation had the effect, however, of emphasizing the value of spraying as a factor having an important bearing upon increasing the yield of apples in seasons of severe fungous visitation, as well as improving the quality of the fruit. To sum up briefly, untreated trees lost their foliage, and consequently their crop of fruit. Spraying prevented the growth of the disease upon the foliage, which was thereby retained, and with it a large proportion of the fruit.

Peaches, cherries and plums were treated with the object mainly of preventing loss from fungous diseases, causing the fruit to rot on the tree.

## PEACHES.

The crop of peaches in the Niagara and St. Catherines districts, where the experiments were carried on, was one of the heaviest in many years. Rot was not severe even on early varieties. Sprayed trees of Early River's and Early Richmond showed 3 to 4 per cent less rotten fruit than those unsprayed. The fruit on sprayed trees was better coloured and finer in appearance than that on trees not treated.

Formula for peaches, 3 lbs. each copper sulphate and lime to the same quantity of water. (*See* Calendar).

## PLUMS.

The principal fungous enemies of the plum are the "shot hole fungus" (*Septoria*), causing the leaves to drop prematurely, and *Monilia*, or fruit rot. These were satisfactorily controlled by spraying. The foliage of the treated trees was retained till the close of the season, and the fruit was 20 to 30 per cent larger, than that on trees not sprayed. The sprayed plums would easily sell as good "firsts," while the unsprayed, owing to small size and lack of colour, could hardly be classed as "seconds."

## CHERRIES.

The cherry suffers from the same diseases as the plum. The following are results gained from two series of experiments in preventing "rot" on Yellow Spanish cherries :

(1.) Sprayed tree yielded 90 lbs. of fruit. Unsprayed tree yielded 30 lbs. of fruit.

(2.) One selected sprayed tree yielded 130 lbs. of fruit, which netted \$9.25. One selected, equally good, unsprayed tree yielded 17 lbs. of fruit, which netted \$1.20.

Spraying cherries not only prevents "rot," but prolongs the ripening season. They should be very carefully sprayed with Bordeaux mixture after the blossoms fall, making two or three applications. The last application, a few days before picking, should be made with ammoniacal copper carbonate.

PLATE I.

NORTHERN SPY. SPRAYED.

Photographed in the orchard of Mr. E. J. Woolverton, Grimsby, Ont., Sept., 1894.

PLATE II.

NORTHERN SPY. NOT SPRAYED.

Photographed in the orchard of Mr. E. J. Woolverton, Grimsby, Ont., Sept., 1894.

## PEARS.

Pear trees were sprayed to prevent "leaf blight" and the "cracking and spotting" of the fruit. The best results gained showed that Flemish Beauty pears sprayed, yielded 75 per cent more marketable fruit than those unsprayed. Beurré Giffard gave practically the same results. The foliage of the treated trees was vastly superior to that on trees unsprayed. Two sprayings before the blossoms opened gave better results than three sprayings after that time. Early applications important.

## APPLES.

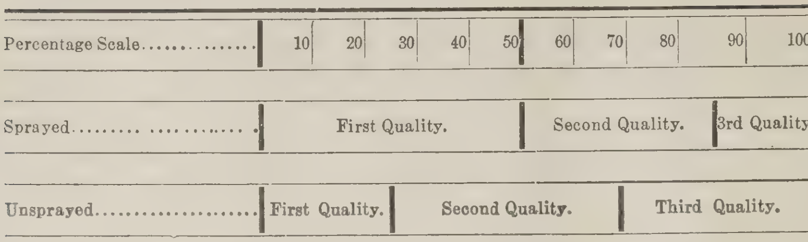
Apples were sprayed in several orchards, mainly to prevent injury from the fungus causing "apple rot" and the depredations of the codling moth.

### AVERAGED RESULTS.

Gained in Spraying Four Leading Varieties.

| Varieties. | How Treated. | PERCENTAGE SCALE. — Grades of Fruit. (10 20 30 40 50 60 70 80 90 100) | | |
|---|---|---|---|---|
| A. G. Russet.. | Sprayed. ...... | First Quality. | Second Quality. | Third Quality. |
| A. G. Russet.. | Unsprayed .... | 1st Quality. | Second Quality. | Third Quality. |
| Baldwin....... | Sprayed. ...... | First Quality. | 2nd Qual. | 3rd Qual. |
| Baldwin....... | Unsprayed.... | First Quality. | Second Quality. | |
| Greening...... | Sprayed. ...... | First Quality. | Second Quality. | 3rd Qual. |
| Greening...... | Unsprayed.... | 1st Qual. | Second Quality. | Third Quality. |
| Northern Spy. | Sprayed. ...... | First Quality. | Second Quality. | 3rd Qual. |
| Northern Spy. | Unsprayed.... | 1st Quality. | Second Quality. | Third Quality. |
| Average of above. | Sprayed. ...... | First Quality. | Second Quality. | 3rd Qual. |
| | Unsprayed.... | 1st Quality. | Second Quality. | Third Quality. |

Averaged Results from all Varieties.




The results gained show that the sprayed trees yielded 24 per cent *more* of first-class fruit, 6 per cent *less* of second-class and 18 per cent *less* of third-class fruit than the same number of trees unsprayed.

The effect of this improvement *in quality alone* upon the gross receipts from an acre of bearing apple trees may be shown as follows: Supposing the yield to be 50 barrels we find according to results gained that spraying would give at ordinary market rates, $2.50, $1.75 and $0.75, for first, second and third class, respectively, $56.75 worth of No. I. fruit, $31.50 worth of "seconds," and $6.97 of "thirds," or a total of $95.22. The same area unsprayed would give of No. I. fruit $26.75, of No. II. $37, and of a third class, $13.64, or a total return of $77.40, leaving a balance in favour of the sprayed acre of $17.82. This is supposing that all the "seconds" and "thirds," which in the case of the unsprayed is very large, could be sold. The cost of spraying an acre of apple trees will vary according to the size of the trees; using diluted Bordeaux mixture and making five applications, it need not exceed $6 and may be under $5. There would thus be a net profit of $10 to $12 on the basis of equal yields and improved quality. As a result of the experiments referred to, and looking at spraying as *affecting the yield*, we find that the sprayed trees give 74 per cent of the total yield. This return added to the improved quality gives a difference in the net receipts of $51.53 in favour of the sprayed acre.

The general results obtained in treating "apple spot" are shown in a graphic way in the preceding chart. The following illustrations engraved from photographs taken at the close of the season give a relative impression of the appearance of sprayed and unsprayed trees in the autumn. The improvement in the foliage of the sprayed trees over the unsprayed was very marked.

There is also added a spraying calendar, which will serve as a working guide to the orchardist throughout the season, giving the time and method of treating the various injurious pests which affect his crops.

## TO CORRESPONDENTS.

Information embodying the results of actual experience in spraying is solicited and will be gratefully received, and further information at my command on this subject will be cheerfully given on application.

SPRAYING CALENDAR.

| Plant. | 1st Application. | 2nd Application. | 3rd Application. |
|---|---|---|---|
| *Apple.* Apple spot fungus, codling moth, bud moth. | *Copper Sulphate.* Before buds start. *(Important.)* | *Bordeaux.* Just before blossoms open. *(Important.)* | *Bordeaux.* *Paris Green.*—Soon after blossoms fall. *(Important.)* |
| *Cherry.* Rot, leaf diseases and injurious insects. | *Bordeaux.* Before flower buds open. *Kerosene Emulsion* for aphis. | *Bordeaux.* *Paris Green.*—When fruit has set. *(Important.)* | *Bordeaux.* *Paris Green.*—10–15 days later. *(Important.)* |
| *Grape.* Mildew, rot, leaf eating insects. | *Copper Sulphate.* Before buds start. | *Bordeaux.* *Paris Green.*—When first leaves are half grown. | *Bordeaux.* When fruit has set. |
| *Peach—Apricot.* Rot, leaf-curl, curculio. | *Copper Sulphate.* *Paris Green.*—Before buds start. | *Bordeaux.* 3 lbs. copper sulphate. 3 lbs. lime. 50 gals. water. *Paris Green* (4oz).—Just before blossom. | *Bordeaux.* *Paris Green.*—Soon after fruit has set. |
| *Pear.* Scab, leaf blight, codling moth. | *Copper Sulphate.* Before buds start. *(Important.)* | *Bordeaux.* Just before blossoms open. *(Important.)* | *Bordeaux.* *Paris Green.*—Soon after blossoms fall. *(Important.)* |
| *Plum.* Rot, shot-hole fungus, curculio. | *Copper Sulphate.* *Paris Green.*—Before buds open. | *Bordeaux.* *Paris Green.*—Soon after blossoms have fallen. *(Important.)* | *Bordeaux.* *Paris Green.*—10–12 days later. |
| *Currant.* Fungous diseases, "currant worm." | *Paris Green.* When worms appear. | *Hellebore.* When fruit is fully formed. | *Bordeaux.* After fruit is picked. |
| *Gooseberry.* Mildew, "currant worms" | *Bordeaux.* *Paris Green.*—As soon as leaves expand. | *Hellebore. Bordeaux.* 10–15 days later. | *Ammoniacal Copper Carbonate.* 10–15 days later. |
| *Raspberry, Blackberry, Dewberry.* Anthracnose, rust. | *Copper Sulphate.* Before buds burst. | *Bordeaux.* 10–15 days later. | *Bordeaux.* After old canes are cut out. |
| *Strawberry.* Rust. | *Bordeaux.* After first blossoms have fallen. | *Bordeaux.* After picking season. | *Bordeaux.* 10–15 days later. |
| *Bean.* Anthracnose. | *Copper Sulphate.* ½ oz. to 1 gal. water. Soak 1 hour. | *Bordeaux.* When rough leaves appear. | *Bordeaux.* 8–12 days later. |
| *Potato.* Scab, rot, insects. | *Corrosive Sublimate.* 2 oz. to 16 gals. water. Soak 1½ hours. | *Paris Green.* For Col. pot. beetle. *Bordeaux* for flea beetle. | *Bordeaux.* From 1st August till end of season, 2 weeks apart. |
| *Tomato.* Rot, blight. | *Bordeaux.* First appearance of rot. | *Bordeaux.* When necessary. | *Bordeaux.* Same. |

SPRAYING CALENDAR.

| 4th Application. | 5th Application. | 6th Application. |
|---|---|---|
| *Bordeaux.* Paris Green.—10–15 days later. | *Bordeaux.* 10–15 days later if spot disease is severe. | |
| *Ammoniacal Copper Carbonate.* 10-15 days later. *(Important.)* | | |
| *Bordeaux.* 10–15 days later. | *Bordeaux.* 10–15 days later. If disease persists. | *Ammoniacal Copper Carbonate.* If disease persists. |
| *Bordeaux.* *Paris Green.*—8–12 days later. | *Bordeaux.* 8–12 days later. If rot is prevalent. | *Ammoniacal Copper Carbonate.* 10–15 days later if rot is prevalent. |
| *Bordeaux.* *Paris Green.*—10-12 days later | *Bordeaux.* 10–15 days later. | |
| *Bordeaux.* *Paris Green.*—10–15 days later. | *Ammoniacal Copper Carbonate.* 10–15 days later if rot is prevalent. | *Ammoniacal Copper Carbonate.* 10–20 days later if rot is prevalent. |
| *Bordeaux.* 10–15 days later. | | |

## FUNGICIDES.

### Copper Sulphate Solution.

Copper sulphate .... 1 lb.
Water .... 25 galls.

For use *only before the buds open.* It is ready for use as soon as dissolved in the water.

### Bordeaux Mixture.

Copper sulphate .... 4 lbs.
Quick lime .... 4 "
Paris Green (for leaf eating insects) .... 4 oz.
Water (1 barrel) .... 40-50 galls.

See page 7 of bulletin No. 23 for method of preparation. To prevent Potato rot 6 lbs. of copper sulphate is used instead of 4.

### Ammoniacal Copper Carbonate.

Copper carbonate .... 5 oz.
Ammonia .... 2 qts.
Water (1 barrel) .... 40-50 gals.

For use late in the season when Bordeaux mixture may stain the fruit. It is also best adapted for green-house spraying. Method of preparation given on page 7 of Bulletin 23.

## INSECTICIDES.

### Kerosene Emulsion.

Kerosene (coal oil) .... 2 galls.
Rain water .... 1 "
Soap .... ½ lb.

To be diluted before use with 9 parts of water. For sucking insects.

### Paris Green and Water.

Paris Green .... 1 lb.
Lime (fresh) .... 1 "
Water .... 200 galls.

For insects which eat foliage.

# INJURIOUS INSECTS.

By James Fletcher, F.R.S.C., F.L.S., *Entomologist and Botanist.*

Insects may be divided into two classes by the nature of their mouth parts. In the first or larger division, Biting Insects (Fig. 1), they are furnished with mandibles or biting jaws, by means of which they consume the substance of their food, as with caterpillars, beetles,

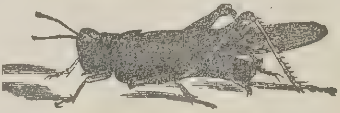


Fig. 1.

Fig. 2.

etc. In the second class, Sucking Insects (Fig. 2), they have, instead of mandibles, a beak or tube, by means of which they suck up their food in a liquid form from beneath the surface, as with the true bugs, plant-lice and flies. It is evident that with the insects of the first class all that is necessary, is to place some poisonous substance on the food plant, which they will eat together with their food. With the second class, however, this would be useless, for they would push their beaks through the poisonous covering on the outside of their food-plant and would extract the juices upon which they live, from the interior. For this class, therefore, some substance must be used which will kill by mere contact with their bodies. Now, for both of these classes of insects, we have cheap and available remedies.

## BITING INSECTS.

For biting or mandibulate insects, Paris green is a sure remedy and, on the whole, has been found superior to any of the other materials which are sometimes recommended. It is, of course, very poisonous to man, as well as to all other animals. Care must, therefore, be taken to keep it out of the reach of children, ignorant people and domestic animals. If applied too strong to the foliage of plants, it is also very destructive and must, therefore, be mixed with some diluent both on this account and for the sake of economy, only a very small quantity being necessary to destroy any known leaf-eating insect. The most convenient diluents are water or some dry powder. For a liquid application, mix one pound of Paris green in 200 gallons of water together with one pound of fresh lime. This may be applied to all plants without danger of injuring the foliage, if proper care be taken to break up the liquid into *a fine spray.* Too much emphasis cannot be laid upon the fact that it is of just as much importance to apply these washes properly—in the form of a spray—as it is to make them of the proper ingredients in the right proportions. This shows the necessity of exercising great care in the selection of a

good spraying nozzle, as a poor nozzle has frequently been the cause of much annoyance, loss of time and materials, and, what is worse, discouragement.

From this cause alone, some have actually given up the work altogether and thus have lost the advantage of what is now recognized to be one of the greatest aids to the fruit-grower, farmer, and gardener, which years of scientific investigation have produced.

In mixing Paris green, it should first be made into a paste with a small quantity of warm water, and the paste subsequently mixed with the larger amount of water required.

In spraying foliage, the spray must be forcibly applied, so as to reach every part, but should be shifted from place to place as soon as the liquid begins to drip from the leaves.

For dry applications, suitable diluents will be found in flour, land-plaster, air-slaked lime, and finely sifted ashes or road-dust. It it of the utmost importance that these should be perfectly dry and in a very fine state of division, so as to mix thoroughly with the insecticide used and to allow of their being distributed evenly over the plants as a very fine powder. The proper quantity of the diluents to be used with the different insecticides will vary with the insects to be treated and the plants to which they are applied. In most cases, one pound of Paris green in 50 of the diluent will be found effective.

There are several instruments for distributing dry poisons, such as bellows, insect-guns, dusting-boxes, etc. Any operation requiring the body to be kept for a long time in a stooping posture while walking, soon becomes extremely tiresome ; it is therefore necessary, for field application, to devise some means for distributing the poison, so as to waste as little as possible of the material and yet allow the body to be kept in its natural position. This is best done by placing the powder to be distributed in a small bag of very fine muslin (two thicknesses, if necessary), and then tying this to the end of a short stick so that it swings freely. It will be found that by tapping the bag lightly with another stick held in the other hand the operator can walk erect, and do much better work than by stooping along over his crop with an aching back.

Dry mixtures should be applied when plants are wet with dew, or in still weather. It is found by experience, however, that during the spring months, when insecticides are most needed, there are often periods of several days when these conditions do not occur. It, therefore, becomes necessary to apply the poisons in some other way, so that the material may be evenly distributed over the plants to be protected, and not blown away by the wind. For this purpose, mixing with water and spraying is the most convenient plan.

After considerable experience I have come to the conclusion that it will repay anyone who has to apply insecticides, to go to the expense of procuring a pair of proper bellows for dry mixtures and a force pump

for liquid applications. Suitable bellows and pumps can now be obtained from most of our Canadian seedsmen. Such make-shift contrivances as ordinary watering cans, whisks, wisps of hay, or bunches of leaves, which are frequently used, actually cost far more in wasted time and materials than would pay for the best special instruments; added to which, when such work is done, it is neither so satisfactory nor so effective.

### THE CODLING MOTH (*Carpocapsa pomonella*, L.)

There is no more striking instance of the good effects of spraying to prevent insect injuries than is shown in the case of the above named insect. The caterpillar, commonly known as the "Apple worm," hatches from an egg laid by a small brown moth in the flower of the apple, pear, and quince. Soon after hatching, it eats its way into the core of the forming apple and destroys it. The annual loss from this insect is enormous; but the satisfactory results which have been obtained whenever systematic spraying has been resorted to, show clearly the great importance of bringing this useful remedy prominently before Canadian fruit-growers at this season of the year. The experience of the past enables us to state positively that Paris green in the proportion of 1 pound to 200 gallons of water, to which 1 pound of lime has been added, sprayed over apple-trees at the time the eggs are laid, is the best, cheapest, and most effective remedy for the Codling Moth. In Eastern Canada, there is only one regular brood of this insect. West of Toronto, there are two broods, the latter of which is by far the more destructive. Where there is only one brood, spraying once or twice early in the spring, immediately after the flowers have fallen, is all that is necessary. In the region where there are two broods, banding the trees in autumn with strips of burlap, wisps of hay, or one of the many contrivances known as "tree protectors," will be found necessary. The caterpillars resort to these shelters when ready to spin their cocoons and may be easily destroyed at any time before the following spring, when the moths emerge.

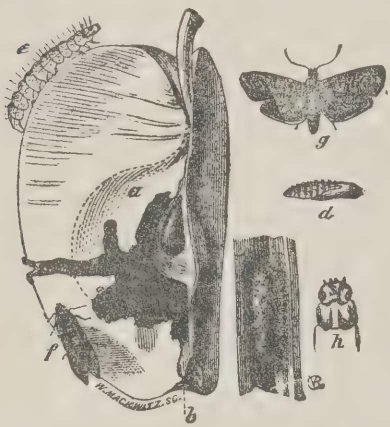



Fig. 3.—The Codling Moth.

Spraying for the Codling Moth should not be done before the petals have fallen from the flowers, as such a practice is very injurious by poisoning bees, and there is no advantage whatever gained by it.

Besides protecting apple trees from the attacks of the Codling Moth, spraying with Paris green immediately after the flowers have fallen will destroy many other enemies which feed on the foliage, such as the Canker-worms, Tent caterpillars, etc.

## THE PLUM CURCULIO (*Conotrachelus nenuphar*, Herbst).

Plums, cherries, peaches, and apples are seriously injured every year by the Plum Curculio. Although the habits are quite different from those of the Codling Moth and it is decidedly more difficult to treat than that insect, experience has shown that spraying with Paris green is, on the whole, the best remedy for this pest also. On emerging in spring, the mature beetles feed on the young twigs, leaves, and buds of the trees. Later on, the leaves and flowers are attacked, and the eggs are laid in the young fruit, in a little flap cut out by the mother beetle. The larva hatches beneath the surface and is at no time within reach of applications. The only chance, therefore, for controlling the Plum Curculio is by poisoning the perfect beetles. Opinions differ as to the extent of immunity of a crop sprayed with Paris green from attack by the Plum Curculio ; but there is, no doubt, sufficient benefit to well repay for the trouble and expense, and the experience of many of the leading plum growers has shown that this remedy is still the cheapest and most practical of all that have been tried.

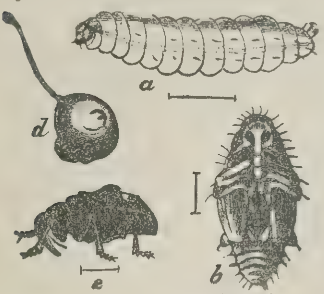


Fig. 11.—The Plum Curculio.

The beetles may be found and eggs are laid during the last week of May and up to the middle of June. The first spraying should take place before the flowers open, and the Paris green may be mixed with Sulphate of copper solution (one pound Sulphate of copper ; two ounces Paris green ; twenty-five gallons of water), so as to treat both fungous diseases and the Curculio at the same time. The second spraying should be made when the plums are about as large as pease, and two subsequent sprayings, a week or ten days apart, will generally be found sufficient. The applications should be made with the Paris green, lime, and water mixture, of the same strength as advised for the Codling Moth. The foliage of peaches and some varieties of plums is so particularly susceptible to injury from the caustic effect of Paris green that until the neutralizing effect of lime upon this causticity was discovered, spraying these with Paris green was impracticable ; now, however, by this simple means Paris green is rendered an available and effective remedy for all leaf-eating insects, even upon delicate plants.

## BORERS.

In addition to the injuries caused by insects which attack the foliage and fruit of orchard trees, much loss is occasioned by the grubs of different kinds of beetles which pierce the bark and wood. These, of course, vary in habits, but for the most part develop from eggs laid by the female beetles or in crevices of the bark. The most effective remedy against these is a deterrent wash applied to the bark at the season of the year when the females resort to the trees for the purpose

of egg-laying. These washes owe their efficacy to some alkaline or malodorous substance which they contain. The best known of these are the following :—

Alkaline Wash.—A wash largely used in Canada is that noted by Prof. Saunders in his "Insects Injurious to Fruits," and consists of "soft soap reduced to the consistence of thick paint by the addition of a strong solution of washing soda in water. If applied during the morning of a warm day, this will dry in a few hours, and form a tenacious coating not easily dissolved by rain."

Carbolic Acid.—Prof. A. J. Cook has experimented extensively with this substance, and claims that no fruit-grower or lover of shade trees can aford to be ignorant of the Carbolic Acid Emulsion. He says: "I make it just as I do the kerosene emulsion, only stronger. One part of carbolic acid—I use the crude material—to from 5 to 7 parts of the soap solution (1 quart soft soap, or 1 lb. hard soap in 2 gallons of water) is of the proper strength. This is the best preparation I know of to protect against the apple tree bark-lice and apple tree borers."

It is applied to the trunks and larger limbs by means of a stiff brush or cloth, about 20 days after the trees blossom.

Carbolic Acid Wash.—Prof. Cook also recommends for radish maggots a preparation made by adding 2 quarts of soft soap to 2 gallons of water, to which, when heated to the boiling point, 1 pint of crude carbolic acid is turned in. For use, one part of this mixture is mixed with 50 of water and sprinkled directly upon the plants once a week from the time they appear above the ground.

## SUCKING INSECTS.

For the large class of insects, such as the true Bugs which have their mouth parts modified into a sucking tube, instead of jaws, Paris green is useless, since these subsist only on the sap of plants or the blood of animals, which they suck up from beneath the surface. For such, some material which will kill by mere contact with their bodies, is necessary. The simplest, best known, and most convenient of these is the "Kerosene Emulsion" which is the standard remedy for all plant-lice, scale-insect, true bugs, animal parasites, red spider, &c., as well as several biting insects which from one cause or another cannot be treated with Paris green.

The best formula, which is known as the Riley-Hubbard formula, is as follows :

Kerosene (coal oil), 2 gallons.
Rain water, 1 gallon.
Soap, ½ lb.

Boil the soap in the water till all is dissolved ; then, while boiling hot, turn it into the kerosene, and churn it constantly and forcibly with a syringe or force pump for five minutes, when it will be of a smooth, creamy nature. If the emulsion be perfect, it will adhere to the surface

of glass without oiliness. As it cools, it thickens into a jelly-like mass. This gives the stock emulsion, which must be diluted with nine times its measure of warm water before using on vegetation. The above quantity of 3 gallons of emulsion will make 30 gallons of wash. Insects breathe through small openings along their sides. The effect of Kerosene emulsion is to suffocate them, by stopping up these breathing pores.

Soap-suds made from whale-oil soap, 1 lb. to 8 gallons of water, is a useful remedy for the destruction of plant-lice.

# POTATO DISEASES.

By James Fletcher, F.R.S.C., F.L.S.

## POTATO BLIGHTS.

There are few diseases of field crops which are the direct cause of more loss to the farmers of Canada than the two blights which have been aptly termed by Prof. L. R. Jones, of Vermont, the Early Blight and Late Blight of potatoes. These are usually confounded under the various names "Potato rot," "Potato blight" and "Potato rust"; but, as a matter of fact, although somewhat similar in general appearance, they are very distinct, and are due to the attacks of two different vegetable parasites.

FIG. 5—THE EARLY BLIGHT.
(*Kindly lent by Prof. L. R. Jones.*)

1. The Early Blight.—This disease is caused by the fungus *Macrosporium solani*, E. & M., and shows itself during the months of June and July, when greyish-brown spots appear upon the older leaves. These soon become dry and crisp, and in bad cases the whole leaf is affected, so that nothing is left but the stems, and the tubers stop growing.

The appearance of this disease is well shown in fig. 5.

FIG. 6—THE LATE BLIGHT.
(*Kindly lent by Prof. L. R. Jones.*)

2. The Late Blight or Potato Rot.—This disease of the potato is due to the attack of a parasitic fungus, known by the name of *Phytophthora infestans*, D. By. The life history of this enemy is briefly as follows: The fungus passes the winter inside the potato tuber and is planted with it in the spring. As soon as the potato throws out its shoots, the parasite grows with it, running up through the tissues of the stems, and from about the end of July produces beneath the leaves an abundance of spores, or seed-like bodies. These are exceedingly minute, but are produced in such numbers that they frequently give a frost-like appearance to the under sides of the leaves. When these spores are produced on the leaves, the appearance known as "rust" shows itself in the shape of dark brown spots, as represented in fig. 6, which are caused by the drying up of the tissues, owing to the parasite having used up their contents. From the rust stage all future infection takes place. Some of the spores are carried by the wind, and, falling upon the leaves of other adjacent plants, produce more rust spots, while others falling to the ground are washed beneath the surface, and reaching the forming tubers, produce the rot stage. The wet-rot, as seen in autumn in the tubers, is the form of this disease which is best known; but potato rot is really a dry-rot which kills the tubers, and in autumn the wet-rot follows as a result of decay. In winter the disease occurs in the tubers, as patches of hard, whitish, diseased tissue.

In the Ottawa district the rust stage does not generally appear until about the 1st of August, and is the first evidence that blight is present in the field. As a rule, the dark spots appear only on a few leaves at first; but, if the weather be favourable, the disease spreads rapidly from spores carried by the wind from these centres of infection, so that a large field may become diseased in a few days, and as a result the crop of potatoes be ruined.

*Remedy.*

Careful experiments have shown that if the Bordeaux Mixture is sprayed over the growing potato plants, it will in a large measure hold in check both of the injurious diseases mentioned. For Early Blight the first application should be made early in July, and a second one a fortnight later. For the Potato rot, the first spraying need not be applied before the 1st of August; and two subsequent applications at intervals of two weeks, will generally carry the crop past all danger.

The formula for making the Bordeaux mixture, which has given the best results in our experiments at Ottawa, is the following:—

Copper sulphate, 6 pounds.

Lime (fresh), 4 pounds.

Water, 45 gallons.

The method of preparing the mixture is described in detail on page 7.

*To apply this mixture* to the foliage, undoubtedly the best and cheapest way is to use a proper spraying pump and nozzle; but, if these are not on hand, good results which will well repay the trouble, may be obtained by applying the mixture with watering cans supplied with fine roses. There are several different kinds of spraying pumps in the market; perhaps the most convenient for this work is a force pump attached to a barrel on wheels, to be drawn through the field by a horse. Smaller machines, known as Knapsack Sprayers, consist of a reservoir containing a small force pump, which can be carried upon a man's back. Both of these kinds of pumps can be purchased for about $10 to $20, and are now for sale by most of our seedsmen. It will be necessary to spray the field two or three times to protect the crop thoroughly. There is no danger of injuring the foliage with the above mixture.

A great advantage of this mixture is that Paris green, the only practical remedy for the Colorado Potato-beetle, can be applied at the same time. To do this, mix from a quarter to half a pound of Paris green with a little water, so as to make a thick paste, and then add it to the 45 gallons of Bordeaux mixture; that is, it is used in exactly the same strength as with plain water.

These mixtures must be kept constantly stirred while being used, as both the lime in the Bordeaux mixture and the Paris green sink quickly to the bottom of any mixture if left undisturbed.

*The time to apply.*—The Bordeaux mixture is a preventive remedy, and the time to apply it in any locality is just before the blights treated of usually appear there, the object being to keep the plants, during the whole of the time they are liable to injury, covered with the fungicidal preparation.

The Early Blight in this part of Canada generally appears at the end of June or early in July. The Late Blight or Potato rot seldom shows itself until August. Therefore, spraying should be begun early in July, and repeated every two weeks at least until the end of August.

## POTATO SCAB.

Another disease of the potato which may be largely controlled by special treatment, is known by the name of "POTATO SCAB." Several causes have been assigned for this disease, such as injuries due to the attacks of insects, the chemical action of some of the ingredients of the soil, excessive moisture, &c.; but the common and most prevalent form of "scab" is due to the presence of a minute parasitic fungus known as *Oospora scabies*, Thaxter, which is easily detected on freshly dug scabby potatoes and which produces the well known corky patches on the tubers. Many experiments have been made during the last five years to discover a practical remedy for this disease, and the best results have been secured by treating the seed potatoes before planting with a solution of CORROSIVE SUBLIMATE. Prof. Bolley, of North Dakota, who was the first to suggest this treatment, recommends as follows :—

"Procure an ordinary barrel, and fit into the base a common wooden faucet. Purchase of a druggist two ounces of finely pulverised corrosive sublimate. Empty this all into 2 gallons of hot water in a wooden or earthenware vessel, and allow it to stand till all is dissolved. Place in the barrel 14 gallons of water; then pour in the two gallons of solution, and mix thoroughly.

"Select as fair seed potatoes as possible; wash off all the dirt, and immerse as many as you wish to treat, in the solution, for one hour and thirty minutes. At the end of this time, turn off the solution into another vessel. The same solution may be used a number of times if necessary."

*Caution:* Corrosive sublimate is a very strong poison, and too great care cannot be exercised in its use. The strength of the solution as here recommended is the same as that used in surgery, and will do no harm externally on the hands, but is a deadly poison if taken internally. When finished with, the solution should be poured out into a hole, dug for the purpose, away from wells or streams or where chicken or farm stock could obtain any of it. No more of the chemical should be purchased than is to be used at the time, and the vessels must not be accidently used for any other purpose by which any risk of poisoning could occur. All potatoes treated must be planted or destroyed.

It should be remembered that the best results will only be obtained by planting clean seed in soil which has not previously produced a scabby crop. Smooth, clean-looking potatoes may still bear the germs of the disease, if they have been mixed with scabby tubers, or have been kept in bags or bins where such had been previously placed. The germs of the scab fungus are known to have remained in the soil for three or four years after an infested crop had been removed, and if these germs be present in the soil, the crop produced may be scabby, although apparently clean seed was used. It is claimed that the scab on beets, swedes, carrots and cabbages is due to the same fungus, and that, therefore, when possible, potatoes should not follow these crops.

# BLACK KNOT OF THE PLUM AND CHERRY.

## PLOWRIGHTIA MORBOSA (Schw.) Sacc.

By John Craig, *Horticulturist.*

The object of publishing this bulletin is not to give to the public the results of new experiments in treating a destructive enemy to fruit-growers, but to stir up and create a wholesome feeling of the danger of allowing this disease to multiply and spread the contagion, and of the necessity of united action in stamping it out. Why should we not exercise the same precautions in preventing the spread of contagious diseases affecting plants, as are employed in checking the spread of diseases of a similar nature affecting animals. Every inducement which incites a desire among orchardists to study this enemy in all its bearings, is a source of congratulation, as a study of its habits cannot fail to reveal its dangerous character, nor fail to point out the only remedy known thus far, by the thorough application of which it may be successfully prevented. It is for this reason then, viz., that of directing attention to the necessity of combined and coöperative action in fighting this enemy, that it is deemed advisable to review briefly the life history of this disease, stating at the same time as concisely as possible the facts upon which the belief in the fungous nature of this malady is based.

The disease known as Black Knot was carefully studied by Dr. Farlow, of Cambridge University, about twenty years ago, then and now the leading mycologist of America. We are indebted to this eminent scientist for much valuable data regarding its habit of growth and multiplication. Not the least important part of his investigations was that which at once proved its fungous nature, and the possibility of transmitting the disease

by inoculation from wild forms of cherries to cultivated garden and orchard varieties. Dr. Farlow states in a bulletin of the Bussey Institute, issued March, 1876, that "we have made direct experiments to show that the spores of the knot on the *choke cherry* will germinate and produce the knot in healthy plum-trees." These experiments disprove the theory which held the necessity of insect agency or assistance in developing the knotty growth.

Black Knot is an exceedingly troublesome disease, found attacking the branches and stems of sweet and sour cherries, *bird cherries. choke cherries*, and all varieties of plums, including the wild plum of the hedgerow and thicket, which frequently is a prolific source of infection, and a menace to neighbouring orchards.

Writing of this fifty years ago the most prominent horticulturist of the time, Mr. A. J. Downing, said that "in some parts of the country this is a most troublesome disease, and has even destroyed the whole race of plum-trees in neighbourhoods where it has been suffered to take its course." Prof. S. A. Beach, Horticulturist of the New York Experiment Station, commenting on this in bulletin No. 40, says: "Could he have looked into the future and seen the plum industry literally wiped out of existence by Black Knot, not only 'in whole neighbourhoods,' but in whole counties along the famous Hudson River Valley, doubtless the strong words quoted above would have seemed to him a faint statement of the destructive character of this disease. Although Downing did not know the real cause of the trouble, yet he urged upon his readers the proper remedy, namely, the destruction of all affected parts by fire; but he advocated burning as early as possible in spring, while, as will be shown hereafter, it is advisable to burn again just after the leaves fall. He also gave the following sound advice: "It will be necessary to prevail on your neighbours, if they are near ones, to enter into this plan, or your labours will be of little value." Had his advice been followed and the work of burning all Black Knots wherever found, been systematically undertaken at that time and enforced by wise laws, supported by strong public sentiment in their favour, there is little reason to doubt that in the favoured localities along the Hudson River commercial plum orchards might have been paying good profits for the last twenty years, instead of presenting as they do discouraging pictures of loss and decay.

It was believed by early writers on this subject that the characteristic knotty excrescences were caused by insects, but this erroneous belief has been clearly disproved by many investigators. Where the disease is abundant the knots are as a rule much infested by insects. It has also been found that they are inhabited by various insects belonging to dif-

ferent orders. Prof. Webster in *Entomological News* for October, 1893, records having bred nine distinct species from one lot of knots collected in a single garden, and this collection did not include the plum curculio well known to breed in the knots as well as in the fruit.

*Fig. 1.*

In an excellent bulletin on this subject Prof. B. D. Halsted (New Jersey Ag. Ex. Sta. Bul., No. 78), the life history of this parasite is given at length and an appeal is made to fruit-growers to induce them to make greater efforts to eradicate so pernicious a foe.

Prof. Halsted says:—In the first place let the reader get a clear understanding of the nature of the enemy that it is proposed to conquer. There is no question whatever about the black knot being caused by a low form of vegetable growth classed with fungi, which sends its minute threads through the substance of the twigs and branches. It is therefore, necessary to gain a knowledge of this fungus, and for this purpose the accompanying engravings have been prepared. (These engravings have been kindly furnished by Dr. Halsted.) While it is generally assumed that the appearance of the disease is familiar to most of our readers, it has been thought well to give some illustrations.

The beginnings of a young knot are first seen in a manifest swelling of the young twig, which is soon followed by a cracking of the bark, and in the rifts thus formed the threads of the fungus come to the surface and clothe it with a covering of olive filaments bearing multitudes of spores. A young branch is shown in figure 1, which exhibits the characteristic swelling of the initial knot and the crack in the back in which the spores are borne. A highly manifested portion of a rift in the bark is shown in figure 2, in which the superficial stalks and their spores are seen. These spores are carried in all directions by the wind, and falling upon the surface of young shoots, germinate, send their filaments through the bars into the growing ring of soft tissue beneath and institute another knot.

As the season advances the young knots and the fresh growth of older ones lose their olive, velvety appearance turn a dark colour, and develop a hard incrustation upon the surface. Within the substance of this black and brittle layer many supherical pits are formed, as shown in fig. 3, and as winter advances, minute sacs are produced on the wall of the cavity, that toward spring bear each eight oval bodies that are known as ascospores. These escape from their long sacs and pass out through a pore at the top of the cavity, and are then ready to be carried by the wind to the surface of a young cherry or plum twig, and thus begin another knot, which, in the course of time, produces a new crop of summer and another

of winter spores, and thus the disease is preserved and propagated. In fig. 4 is shown two of the sacs with the eight spores in each. A free

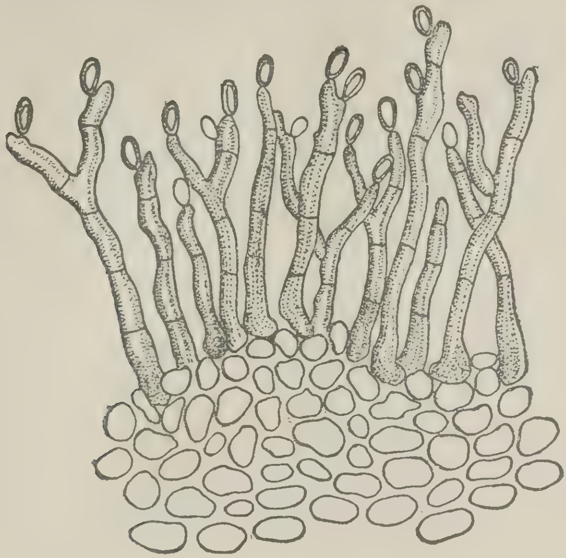


*Fig. 2.*

spore is also shown in the process of germination. It is a fact that cannot be too emphatically stated here that the ascospores above mentioned are matured during the winter months, and that they will continue to ripen when the knots have been removed from the trees, and therefore may be omitted from special mention. The fact of their existence only strengtens

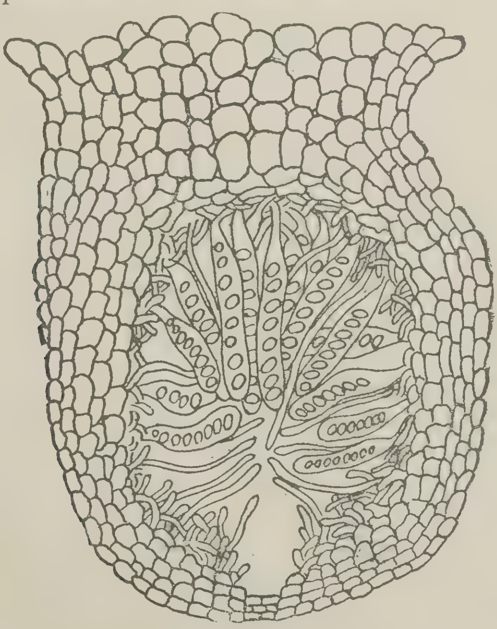


*Fig. 3.*

the previous conviction that the black knot we have a fungus perennial in its character, and wonderfully provided with methods of spore formation for the rapid spreading of the malady at all seasons of the year."

This pest is known to attack at least eight species of the genus *prunus* —plum and cherry family. The appearence of the knot varies somewhat among the various species, but, as Dr. Halsted points out, "it has been demonstrated by direct inoculation that spores from the knot of the choke cherry will produce the quite dissimilar excrescences common to the garden plum," a fact that in this connection it is important to know.

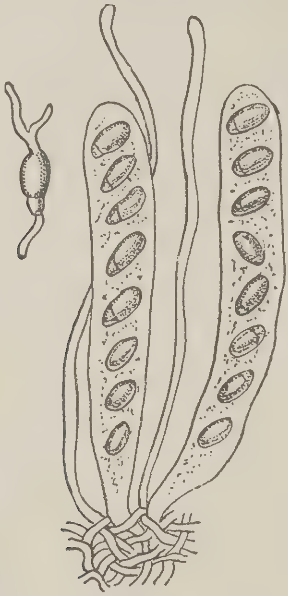


*Fig.* 4.

REMEDIES.

Many of the fungous diseases which attack our field and garden crops may now be countrolled by the application of Bordeaux mixture. This is made of equal parts of copper sulphate and lime dissolve and diluted with water. Ammoniacal copper carbonate is also quite effective in preventing the same diseases. The peculiar method by which this disease propagate itself, together with its perennial nature, militates against the usefulness of the copper salt remedies, as the above mixtures are called, although there is no doubt that a thorough application of Bordeaux mixture to affected trees at the time of the dissipation of the summer spores would in a measure prevent the spread of the disease. Results of experiments conducted by Prof. Lodeman, of Connell University, N.Y., recently published, indicate that Bordeaux mixture may be used in preventing the spread of Black Knot with considerable success. The best remedy however is to *cut off and burn promptly every knot which makes its appearance* on plum or cherry-tree. This remedy is effectual only in proportion as it is generally applied. A public sentiment is needed which will

call for concerted and united action. Cherry and plum-trees should be carefully examined for knots two or three weeks after growth begins in the spring and again after the leaves fall in the autumn.

When trees are badly attacked it is best to cut them down and destroy them by fire, root and branch. When the smaller branches only are affected the knots should be cut off, taking care to cut 5 or 6 inches below the knotty portion. The cut surface should then be painted with linseed oil or turpentine.

It should be remembered that an affected branch cut off, and thrown on the ground will be just as useful in spreading the disease as if left on the tree. The spores will ripen in knots on separated branches with equal facility. Single knots which sometimes appear on the trunks or main limbs of trees should be carefully pared off and the wound treated with a mixture of linseed oil and red oxide of iron. Saturating the knots with kerosene will kill them, but it will also injure the healthy wood, and if applied freely will cause the branch to die.

In many cherry and plum growing districts neglected fence corners and thickets of choke cherry, native plum and cherry, breed millions of spores of black knot which are a constant source of danger to surrounding orchards. In village and city gardens too often do we find trees covered with knots, and producing nothing from year to year but a crop of spores by which the disease is propagated and spread. These infested trees which act as breeding grounds should be rigorously destroyed.

It has been already pointed out, and it is repeated again for the sake of emphasis, that a single hedge-row or thicket of knotty wild plum or cherry will furnish sufficient spores, or seeds, to spread the disease over and infect an entire neighbourhood. The remedy is simple and effective, and if united action could be incited and aided, by the passing and enforcing of suitable laws, such a course would be certain to produce good results.

The disease is dangerously prevalent in the provinces of Quebec and Ontario. It also exists to some extent in the maritime provinces and in Manitoba. Its presence in British Columbia has not yet been reported. The provinces of Ontario and British Columbia have very wisely passed laws which, if strictly enforced, will leave the fruit growers little to fear from this disease.

The following is a summary of the Act relating to the suppression of this disease now in force in Ontario. Most of the fruit growing States of the Union have laws of a similar nature in operation.

### BLACK KNOT LAW.

In Ontario an Act was passed in 1893, intitled the "Yellows and Black Knot Act." This Act provided that—

3. "It shall be the duty of every occupant of land, or if the land be unoccupied it shall be the duty of the owner:—

"(1) To cut out and burn all black knots found on plum or cherry-trees on his land so often each year as it shall appear on such tree;"

and in relation to the yellows, a fungous disease of contagious character, attacking peach-trees, owners and occupants are ordered—

"(2) To cut down and burn any peach, nectarine or other trees on his land affected with the disease known as the "yellows" and to destroy all the fruit of these trees so infected."

Municipal councils have the power to appoint district inspectors whose duty it is to enforce the law. A fine of "not less than $5.00 and not more than $20.00" may be imposed for every offence or case of non-compliance with the requirements of the Act.

The Act also provides for an appeal from the decision of the inspector, as well as outlining the duty of municipal councils.

## RECAPITULATION.

A few of the salient points in connection with the nature of this disease, and the measures which should be adopted for its prevention, may be briefly enumerated as follows:—

1. Black Knot is due to a fungous disease and spreads rapidly by means of spores.

2. Several species of insects have been observed inhabiting the knots, but none of them belong to the gall-producing kinds, and most of these insects are also found upon other trees which never produce knots.

3. The same fungus attacks the wild species of plum and cherry and may be communicated by them to cultivated forms.

4. The only sure remedy is to examine carefully for knots all plum and cherry-trees twice each year. The first time two or three weeks after growth begins in spring, and again after the leaves fall in autumn. Bordeaux mixture is worthy of trial to prevent dissemination of summer spores.

5. Cut off all knots five or six inches below the affected portion, and paint the wounds with turpentine or linseed oil.

6. Burn all prunings and affected branches which are removed.

7. United action on the part of all fruit-growers is necessary in order to secure the best results from the enforcement of these recommendations.

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

BULLETIN No. 24

## RESULTS OBTAINED IN 1895 FROM TRIAL PLOTS OF IMPORTANT FARM CROPS

MARCH, 1896.

PUBLISHED BY DIRECTION OF THE HON. W. H. MONTAGUE, MINISTER OF AGRICULTURE.

To the Honourable
The Minister of Agriculture.

SIR,—I have the honour to submit for your approval Bulletin 24 of the Experimental Farm series, which has been prepared by myself. In this bulletin will be found the results of a large number of experiments which have been carried on at all the experimental farms during 1895 with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots and potatoes in uniform test plots. This work has been undertaken for the purpose of gaining information as to the relative productiveness of the many varieties under trial and their earliness of maturing.

I trust that the information submitted, covering the results obtained under most of the more important climatic variations found in the Dominion, will be useful to farmers everywhere throughout Canada.

I have the honour to be,
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

Ottawa, 11th March, 1895.

# RESULTS OBTAINED IN 1895

FROM

# TRIAL PLOTS OF IMPORTANT FARM CROPS

By Wm. Saunders, F.R.S.C., F.L.S., F.C.S.,

*Director Experimental Farms.*

Early in 1891 a series of uniform experiments was planned, to be carried on at all the experimental farms for growing in special plots, side by side on land of uniform character, many different sorts of oats, barley, wheat, pease, corn, mangels, carrots, turnips and potatoes. The seed of each variety selected has been of uniform quality and all from the same source, a sufficient quantity having been procured at the Central Farm and from thence distributed to the Branch Farms. Instructions were given to sow the plots of oats, barley and wheat as early as practicable after the land was in fit condition to receive the seed, and suitable directions sent as to the sowing or planting of the other plots and the quantity of seed to be used in each case. The land selected for the purpose was to be as uniform in character as could be found, all the plots of one sort to be side by side and to be sown on the same day or the day following.

The main object in view in undertaking this work was to ascertain the relative yield of these different sorts under uniform conditions and their time of ripening in the different climates in which they were grown. These tests have been continued with more or less completeness from year to year since 1891, and a large number of useful facts recorded, which have been presented at the close of each season in the Annual Reports of the Experimental Farms. This information has proved of great practical value to farmers in different parts of the Dominion many of whom have been guided in the selection of seed by the results obtained from these tests of varieties. Since there is a general desire that this information be given each year in time to aid the farmer in his work during the following season, and it does not seem practicable to complete and issue the Annual Report sufficiently early to serve that purpose, this bulletin has been prepared in which the results obtained during 1895 are given in a condensed form. In these pages there will be found side by side the crops produced from all the varieties tested at each of the experimental farms, also the average of the crops at all the farms. The average time required for the maturing of the different sorts of grain in each case is also given. The varieties are all arranged in the order of their productiveness at the Central Experimental Farm at Ottawa.

# OATS.

Forty-four varieties of oats have been under trial during 1895, the size of the plots were $\frac{1}{10}$th acre each at Brandon, Man. and Indian Head, N. W. T. and $\frac{1}{20}$th acre each at Ottawa, Ont. Nappan, N. S. and Agassiz, B. C. The quantity of seed sown of each variety was in the proportion of two bushels per acre and the dates of sowing were as follows:—Ottawa, 29th and 30th April; Nappan, 3rd May; Brandon, 22nd April; Indian Head, 23rd April, and Agassiz, 23rd April.

UNIFORM TEST PLOTS OF OATS.

| Number. | Name of variety. | Yield at the Several Experimental Farms, Season of 1895. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Banner | 74 | 4 | 54 | 24 | 101 | 6 | 90 | .. | 48 | 3 | 73 | 21 | 98 | 105 | 124 | 130 | 120 | 115 2/5 |
| 2 | Abundance | 73 | 8 | 56 | 16 | 79 | 14 | 108 | 28 | 43 | 28 | 72 | 12 | 98 | 107 | 128 | 137 | 120 | 118 |
| 3 | American Beauty | 72 | 12 | 64 | 24 | 96 | 6 | 101 | 16 | 42 | 22 | 75 | 16 | 100 | 107 | 128 | 134 | 120 | 117 4/5 |
| 4 | Improved Ligowo | 70 | 20 | 54 | 24 | 81 | 16 | 87 | 22 | 40 | 30 | 67 | 2 | 99 | 105 | 128 | 133 | 118 | 116 3/5 |
| 5 | Golden Beauty | 69 | 4 | 69 | 14 | 83 | 28 | 104 | 4 | 47 | 12 | 74 | 26 | 101 | 105 | 129 | 133 | 121 | 117 4/5 |
| 6 | Columbus | 69 | 4 | 59 | 14 | 91 | 26 | 102 | 2 | 38 | 8 | 72 | 4 | 100 | 104 | 128 | 137 | 120 | 117 4/5 |
| 7 | American Triumph | 68 | 18 | 36 | 16 | 68 | 8 | 85 | .. | 34 | 26 | 58 | 24 | 100 | 115 | 134 | 136 | 125 | 122 |
| 8 | White Russian | 67 | 32 | 60 | .. | 86 | 16 | 75 | .. | 34 | 24 | 64 | 28 | 98 | 103 | 131 | 137 | 125 | 118 4/5 |
| 9 | Bavarian | 67 | 2 | 60 | 20 | 93 | 8 | 76 | 16 | 42 | 12 | 67 | 32 | 100 | 105 | 124 | 133 | 120 | 116 2/5 |
| 10 | White Schonen | 66 | 2 | 54 | 24 | 93 | 8 | 99 | 22 | 35 | 30 | 69 | 31 | 100 | 104 | 128 | 130 | 122 | 116 4/5 |
| 11 | Wide-Awake | 65 | .. | 52 | 12 | 77 | 2 | 89 | 14 | 28 | 8 | 62 | 14 | 102 | 103 | 134 | 136 | 120 | 119 |
| 12 | Wallis | 63 | 28 | 54 | 24 | 88 | 18 | 67 | 12 | 35 | 10 | 61 | 32 | 100 | 106 | 129 | 137 | 120 | 118 2/5 |
| 13 | Cream Egyptian | 62 | 22 | 57 | 2 | 47 | 22 | 82 | 32 | 49 | 14 | 59 | 25 | 99 | 103 | 121 | 130 | 115 | 113 3/5 |
| 14 | Oderbruch | 60 | 20 | 58 | 28 | 89 | 4 | 99 | 14 | 30 | 30 | 67 | 26 | 99 | 103 | 128 | 137 | 125 | 118 2/5 |
| 15 | Abyssinia | 60 | .. | 62 | 12 | 86 | 26 | 82 | 22 | 46 | 6 | 67 | 20 | 98 | 104 | 128 | 137 | 121 | 117 3/5 |
| 16 | Early Golden Prolific | 59 | 24 | 72 | 12 | 93 | 8 | 73 | 18 | 48 | 18 | 69 | 16 | 97 | 106 | 128 | 137 | 120 | 117 3/5 |
| 17 | Joanette | 59 | 24 | 52 | 12 | 81 | 16 | 78 | 28 | 37 | 32 | 62 | 2 | 102 | 104 | 136 | 132 | 120 | 118 4/5 |
| 18 | California Prolific Black | 59 | 14 | 59 | 14 | 76 | 26 | 67 | 12 | 37 | 22 | 60 | 4 | 104 | 104 | 146 | 133 | 125 | 122 2/5 |
| 19 | Lincoln | 58 | 28 | 50 | 20 | 81 | 26 | 73 | 28 | 46 | 26 | 62 | 12 | 97 | 104 | 128 | 131 | 120 | 116 |
| 20 | Giant Cluster | 58 | 8 | 63 | 18 | 80 | .. | 70 | .. | 36 | 6 | 61 | 22 | 105 | 115 | 134 | 137 | 120 | 122 1/5 |
| 21 | Flying Scotchman | 58 | 8 | 36 | 16 | 81 | 6 | 86 | 16 | 36 | 16 | 59 | 26 | 93 | 99 | 124 | 130 | 115 | 112 1/5 |
| 22 | Coulommiers Black | 56 | 16 | 44 | 4 | 77 | 12 | 57 | 12 | 40 | .. | 55 | 2 | 115 | 116 | 136 | 141 | 125 | 126 3/5 |
| 23 | Early Archangel | 56 | 6 | 44 | 4 | 88 | 8 | 88 | 8 | 48 | 28 | 65 | 4 | 88 | 98 | 126 | 130 | 118 | 112 |
| 24 | Prolific Black Tartarian | 56 | 6 | 48 | 8 | 74 | 4 | 72 | 22 | 40 | 10 | 58 | 10 | 104 | 108 | 146 | 133 | 118 | 121 4/5 |
| 25 | Early Blossom | 55 | 30 | 62 | 12 | 79 | 14 | 75 | .. | 45 | 20 | 63 | 22 | 103 | 107 | 134 | 137 | 121 | 120 2/5 |
| 26 | Rosedale | 55 | 30 | 48 | 28 | 87 | 2 | 81 | 16 | 37 | 32 | 62 | 8 | 98 | 104 | 122 | 137 | 118 | 115 4/5 |
| 27 | Imported Irish | 55 | 30 | 57 | 22 | 66 | 26 | 63 | 8 | 35 | 20 | 55 | 21 | 93 | 98 | 121 | 129 | 115 | 111 1/5 |
| 28 | Poland | 55 | 10 | 51 | 6 | 67 | 2 | 69 | 4 | 41 | 6 | 56 | 26 | 93 | 99 | 122 | 137 | 115 | 113 1/5 |
| 29 | Holstein Prolific | 54 | 4 | 54 | 24 | 95 | 20 | 89 | 24 | 33 | 18 | 65 | 18 | 101 | 106 | 128 | 137 | 120 | 118 2/5 |
| 30 | Early Gothland | 52 | 2 | 66 | 16 | 84 | 24 | 53 | 18 | 59 | 14 | 63 | 6 | 97 | 106 | 131 | 130 | 118 | 116 2/5 |
| 31 | Scottish Chief | 51 | 6 | 40 | 20 | 65 | .. | 77 | 22 | 34 | 24 | 53 | 28 | 91 | 97 | 122 | 133 | 118 | 112 1/5 |
| 32 | Victoria Prize | 51 | 6 | 52 | 32 | 68 | 8 | 78 | 28 | 24 | 24 | 55 | 6 | 92 | 98 | 122 | 129 | 115 | 111 1/5 |
| 33 | Bonanza | 51 | 6 | 44 | 24 | 44 | 24 | 85 | 10 | 44 | 24 | 54 | 4 | 94 | 103 | 122 | 133 | 120 | 114 2/5 |
| 34 | Welcome | 49 | 14 | 47 | 22 | 41 | 26 | 81 | 16 | 30 | 20 | 50 | 6 | 98 | 97 | 120 | 134 | 120 | 113 4/5 |
| 35 | Early Etampes | 48 | 28 | 54 | 4 | 57 | 32 | 50 | 10 | 36 | 7 | 49 | 16 | 102 | 104 | 146 | 134 | 120 | 121 1/5 |
| 36 | Prize Cluster | 48 | 28 | 43 | 18 | 60 | 30 | 73 | 28 | 36 | 14 | 52 | 24 | 93 | 97 | 122 | 128 | 115 | 111 |
| 37 | White Wonder | 46 | 6 | 51 | 16 | 52 | 2 | 71 | 16 | 39 | 24 | 52 | 6 | 91 | 97 | 122 | 130 | 115 | 111 |
| 38 | Siberian | 45 | 10 | 38 | 28 | 87 | 12 | 86 | 26 | 30 | .. | 57 | 22 | 94 | 103 | 128 | 128 | 115 | 113 3/5 |
| 39 | Winter Grey | 42 | 22 | 32 | 12 | 77 | 2 | 81 | 6 | 31 | 6 | 52 | 30 | 94 | 103 | 128 | 128 | 115 | 113 3/5 |
| 40 | Hazlett's Seizure | 42 | 12 | 49 | 14 | 74 | 4 | 79 | 14 | 52 | 32 | 59 | 22 | 100 | 97 | 122 | 133 | 118 | 114 |
| 41 | Rennie's Prize White | 40 | .. | 37 | 22 | 61 | 16 | 67 | 22 | 34 | 24 | 48 | 10 | 96 | 98 | 123 | 136 | 118 | 114 1/5 |
| 42 | White Monarch | 34 | 24 | 31 | 26 | 68 | 8 | 69 | 24 | 35 | 30 | 48 | 2 | 108 | 107 | 131 | 137 | 120 | 120 3/5 |
| 43 | Scotch Hopetown | 28 | 8 | 51 | 6 | 61 | 26 | 45 | 20 | 17 | 2 | 40 | 26 | 112 | 113 | 139 | 137 | 118 | 123 4/5 |
| 44 | Doncaster Prize | 16 | 16 | 38 | 8 | 56 | 16 | 69 | 4 | 32 | 2 | 42 | 16 | 109 | 106 | 128 | 137 | 121 | 120 1/5 |

The twelve varieties of oats which have produced the largest crops during 1895 at the several experimental farms are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 74 | 4 | 7. American Triumph | 68 | 18 |
| 2. Abundance | 73 | 8 | 8. White Russian | 67 | 32 |
| 3. American Beauty | 72 | 12 | 9. Bavarian | 67 | 2 |
| 4. Improved Ligowo | 70 | 20 | 10. White Schonen | 66 | 2 |
| 5. Golden Beauty | 69 | 4 | 11. Wide-Awake | 65 | 0 |
| 6. Columbus | 69 | 4 | 12. Wallis | 63 | 28 |

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Golden Prolific | 72 | 12 | 7. Abyssinia | 62 | 12 |
| 2. Golden Beauty | 69 | 14 | 8. Early Blossom | 62 | 11 |
| 3. Early Gothland | 66 | 16 | 9. Bavarian | 60 | 20 |
| 4. American Beauty | 64 | 24 | 10. White Russian | 60 | 0 |
| 5. Golden Giant | 64 | 4 | 11. Columbus | 59 | 14 |
| 6. Giant Cluster | 63 | 18 | 12. California Prolific, black | 59 | 14 |

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 101 | 6 | 7. Columbus | 91 | 26 |
| 2. American Beauty | 96 | 6 | 8. Golden Giant | 90 | 20 |
| 3. Holstein Prolific | 95 | 20 | 9. Oderbruch | 89 | 4 |
| 4. Bavarian | 93 | 8 | 10. Wallis | 88 | 18 |
| 5. White Schonen | 93 | 8 | 11. Early Archangel | 88 | 8 |
| 6. Early Golden Prolific | 93 | 8 | 12. Siberian | 87 | 12 |

### Experimental Farm for the North-west Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Abundance | 108 | 28 | 7. Banner | 90 | 0 |
| 2. Golden Beauty | 104 | 4 | 8. Holstein Prolific | 89 | 24 |
| 3. Columbus | 102 | 2 | 9. Wide-Awake | 89 | 14 |
| 4. American Beauty | 101 | 16 | 10. Early Archangel | 88 | 8 |
| 5. White Schonen | 99 | 22 | 11. Improved Ligowo | 87 | 22 |
| 6. Oderbruch | 99 | 14 | 12. Siberian | 86 | 26 |

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Gothland | 59 | 9 | 7. Golden Beauty | 47 | 12 |
| 2. Hazlett's Seizure | 52 | 32 | 8. Lincoln | 46 | 26 |
| 3. Cream Egyptian | 49 | 14 | 9. Abyssinia | 46 | 6 |
| 4. Early Archangel | 48 | 28 | 10. Early Blossom | 45 | 20 |
| 5. Early Golden Prolific | 48 | 18 | 11. Bonanza | 44 | 24 |
| 6. Banner | 48 | 3 | 12. Abundance | 43 | 28 |

The twelve varieties which have produced the largest average crops on all the farms, and hence may perhaps be regarded as worthy of being placed at the head of the list for general cultivation, are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Beauty | 75 | 16 | 7. Early Golden Prolific | 69 | 16 |
| 2. Golden Beauty | 74 | 26 | 8. Bavarian | 67 | 32 |
| 3. Banner | 73 | 21 | 9. Oderbruch | 67 | 26 |
| 4. Abundance | 72 | 12 | 10. Abyssinia | 67 | 20 |
| 5. Columbus | 72 | 4 | 11. Improved Ligowo | 67 | 2 |
| 6. White Schonen | 69 | 31 | 12. Holstein Prolific | 65 | 18 |

In this latter list comprising the most promising varieties for the whole country there will be found eight out of the twelve sorts first in productiveness at Ottawa, six of the best twelve at Nappan, N.S., eight out of the best twelve at Brandon, Man., nine of the best twelve at Indian Head, N.W.T., and five of the best twelve at Agassiz, B.C.

## BARLEY.

The trial of plots of barley for 1895 have included thirteen different sorts of two-rowed barley and fourteen of six-rowed. The plots were of the same size as those of the oats, the quantity of seed sown in each case was two bushels per acre, and the following were the dates of sowing: Ottawa, 2nd May; Nappan, 2nd May; Brandon, 15th May; Indian Head, 1st May, and Agassiz, 24th April.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1895. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days | Days. | Days. | Days. | Days. |
| 1 | Sidney ........... | 43 | 16 | 27 | 40 | 60 | 9 | 42 | 44 | 27 | 14 | 40 | 15 | 91 | 105 | 105 | 121 | 110 | 106⅖ |
| 2 | Duck-bill......... | 37 | 24 | 30 | 20 | 30 | 20 | 57 | 4 | 45 | | 40 | 4 | 104 | 104 | 100 | 123 | 113 | 108⅘ |
| 3 | Bolton........... | 35 | 30 | 34 | 8 | ..... | | 46 | 10 | 30 | 25 | 36 | 30 | 94 | 97 | .... | 125 | 110 | 106 2/4 |
| 4 | Beaver........... | 35 | | 27 | 24 | 50 | 10 | 52 | 2 | 36 | 2 | 40 | 8 | 97 | 106 | 105 | 125 | 113 | 109⅕ |
| 5 | French Chevalier . | 34 | 18 | 47 | 44 | 62 | 14 | 54 | 38 | 38 | 16 | 47 | 26 | 97 | 104 | 103 | 125 | 110 | 107⅘ |
| 6 | Newton .......... | 29 | 18 | 35 | 20 | 56 | 2 | 48 | 5 | 34 | 8 | 40 | 30 | 99 | 104 | 103 | 122 | 113 | 108⅕ |
| 7 | Prize Prolific ..... | 28 | 6 | 38 | 16 | 42 | 12 | 59 | | 33 | 16 | 40 | 11 | 97 | 105 | 103 | 127 | 114 | 109⅕ |
| 8 | Danish Chevalier . | 27 | 34 | 42 | 24 | 41 | 22 | 54 | 18 | 39 | 28 | 41 | 6 | 98 | 104 | 104 | 125 | 113 | 108⅘ |
| 9 | Kinver Chevalier . | 26 | 42 | 37 | 4 | 45 | 30 | 56 | 22 | 28 | 16 | 38 | 42 | 94 | 108 | 105 | 127 | 114 | 109⅗ |
| 10 | California Prolific. | 26 | 2 | 29 | 8 | 57 | 14 | 48 | | 24 | 30 | 37 | 1 | 98 | 105 | 104 | 122 | 113 | 108⅖ |
| 11 | Canadian Thorpe . | 25 | 40 | 46 | 32 | 58 | 16 | 50 | 6 | 41 | 32 | 44 | 25 | 98 | 103 | 104 | 122 | 113 | 108 |
| 12 | Thanet......... .. | 21 | 42 | 35 | 20 | 43 | 46 | 54 | 40 | 32 | 24 | 37 | 34 | 97 | 106 | 103 | 127 | 114 | 109⅖ |
| 13 | Rigid ............ | 20 | 8 | 22 | 44 | ...... | | 48 | 16 | 26 | 12 | 39 | 11 | 99 | 106 | 103 | 119 | 114 | 108⅕ |

The sowing of Bolton was overlooked at Brandon, and the crop of Rigid was accidentally mixed with another variety in stooking, hence particulars of the yield there of these varieties cannot be given.

## UNIFORM TEST PLOTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season 1895. Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Number of Days from Sowing to Harvesting. Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Mensury ......... | 58 | 6 | 44 | 28 | 68 | 46 | 43 | 36 | 27 | 44 | 48 | 32 | 84 | 93 | 99 | 116 | 97 | $97\frac{4}{5}$ |
| 2 | Petschora ........ | 51 | 42 | 37 | 44 | 56 | 42 | 31 | 29 | 33 | 16 | 42 | 15 | 78 | 92 | 94 | 112 | 96 | $94\frac{2}{5}$ |
| 3 | Royal ............ | 51 | 12 | 45 | 20 | 65 | 30 | 41 | 42 | 29 | 38 | 46 | 38 | 79 | 92 | 97 | 118 | 97 | $96\frac{3}{5}$ |
| 4 | Success .......... | 51 | 12 | 45 | 40 | 30 | 10 | 45 | 40 | 26 | 37 | 39 | 47 | 76 | 92 | 87 | 108 | 96 | $91\frac{4}{5}$ |
| 5 | Odessa ........... | 47 | 24 | 52 | 4 | 60 | 10 | 54 | 28 | 38 | 36 | 50 | 30 | 83 | 92 | 98 | 116 | 107 | $99\frac{1}{5}$ |
| 6 | Oderbruch ...... | 47 | 14 | 38 | 16 | 48 | 46 | 40 | .. | 36 | 27 | 42 | 11 | 87 | 93 | 97 | 116 | 97 | 98 |
| 7 | Trooper . ........ | 46 | 42 | 43 | 16 | 65 | 10 | 45 | 40 | 33 | 46 | 47 | 2 | 82 | 99 | 97 | 122 | 106 | $101\frac{1}{5}$ |
| 8 | Stella ........... | 46 | 2 | 34 | 28 | 53 | 36 | 41 | 32 | 32 | 4 | 41 | 30 | 78 | 103 | 105 | 125 | 106 | $103\frac{2}{5}$ |
| 9 | Vanguard ........ | 44 | 28 | 40 | 20 | 64 | 8 | 37 | 24 | 31 | 12 | 43 | 28 | 79 | 93 | 95 | 116 | 99 | $96\frac{2}{5}$ |
| 10 | Common ......... | 43 | 46 | 42 | 4 | 63 | 6 | 41 | 20 | 28 | 6 | 43 | 36 | 80 | 92 | 96 | 116 | 106 | 98 |
| 11 | Nugent .... ..... | 42 | 44 | 31 | 32 | 68 | 26 | 42 | 34 | 24 | 8 | 42 | .. | 85 | 99 | 99 | 119 | 106 | $101\frac{3}{5}$ |
| 12 | Summit .......... | 39 | 28 | 34 | 8 | 58 | 46 | 40 | 30 | 29 | 33 | 40 | 29 | 84 | 103 | 99 | 122 | 106 | $102\frac{4}{5}$ |
| 13 | Surprise . . ..... | 36 | 12 | 41 | 32 | 65 | 10 | 38 | 26 | 24 | 14 | 41 | 9 | 86 | 103 | 98 | 122 | 106 | 103 |
| 14 | Rennie's Improved | 32 | 14 | 32 | 44 | 51 | 32 | 62 | 14 | 28 | 16 | 41 | 24 | 83 | 94 | 95 | 128 | 97 | $99\frac{2}{5}$ |

In these tests of varieties of barley some of the new hybrid* sorts which have been produced at the Experimental Farms made a good showing. These both in the two-rowed and six-rowed groups have had a common parentage, having all been produced from a hybrid obtained by fertilizing the Swedish two-rowed with pollen from Baxter's six-rowed and nearly all the varieties have originated from one kernel of the Swedish two-rowed thus influenced. The plant grown from this kernel produced the first year two-rowed heads entirely, but when this seed was sown the next season it sported into a number of different forms, some of which were six-rowed, some two-rowed and others intermediate in character. Types of the most promising of these were chosen and the grain has since been carefully selected to conform to these types. Sporting occurred from year to year in most of these types for several years, more in some than in others, the sports have been removed and rejected and now these types have become fairly well fixed. The hybrids in the list of two-rowed sorts are Sidney, Bolton, Beaver and Rigid, and those among the six-rowed sorts are Royal, Trooper, Stella, Vanguard, Nugent, Summit and Surprise.

* The term hybrid is used when referring to new forms produced by crossing plants which are classed by botanists as distinct species, and the word cross-bred when referring to the crosses produced between different varieties of the same species.

## Two-rowed Barley.

The six varieties of two-rowed barley which have produced the largest crops during 1895 at the several experimental farms are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Sidney | 43 | 16 | 4. Beaver | 35 | |
| 2. Duck-bill | 37 | 24 | 5. French Chevalier | 34 | 18 |
| 3. Bolton | 35 | 30 | 6. Newton | 29 | 18 |

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 47 | 44 | 4. Prize Prolific | 38 | 16 |
| 2. Canadian Thorpe | 46 | 32 | 5. Kinver Chevalier | 37 | 4 |
| 3. Danish Chevalier | 42 | 24 | 6. Newton | 35 | 20 |

### Experimental Farm for Manitoba, Brandon, Man.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 62 | 14 | 4. California Prolific | 57 | 14 |
| 2. Sidney | 60 | 9 | 5. Newton | 56 | 2 |
| 3. Canadian Thorpe | 58 | 16 | 6. Beaver | 50 | 10 |

### Experimental Farm for the North-west Territories, Indian Head, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Prize Prolific | 59 | | 4. Thanet | 54 | 40 |
| 2. Duck-bill | 57 | 4 | 5. French Chevalier | 54 | 38 |
| 3. Kinver Chevalier | 56 | 22 | 6. Danish Chevalier | 54 | 18 |

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Duck-bill | 45 | | 4. French Chevalier | 38 | 16 |
| 2. Canadian Thorpe | 41 | 32 | 5. Beaver | 36 | 2 |
| 3. Danish Chevalier | 39 | 28 | 6. Newton | 34 | 8 |

The six varieties of two-rowed barley which have produced the largest crops taking the average of the results obtained on all the experimental farms are

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 47 | 26 | 4. Newton | 40 | 30 |
| 2. Canadian Thorpe | 44 | 25 | 5. Sidney | 40 | 15 |
| 3. Danish Chevalier | 41 | 6 | 6. Prize Prolific | 40 | 11 |

In this latter list which includes the most promising varieties for general cultivation there will be found three out of the six sorts first in productiveness at Ottawa, Ont., five of the best six at Nappan, N.S., four out of the best six at Brandon, Man., three of the best six at Indian Head, N.W.T., and four of the best six at Agassiz, B.C.

## Six-rowed Barley.

The six varieties of six-rowed barley which have produced the largest crops at the several experimental farms during 1895 are the following:

### Central Experimental Farm, Ottawa, Ont.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 58 | 6 | 4. Success | 51 | 12 |
| 2. Petschora | 51 | 42 | 5. Odessa | 47 | 24 |
| 3. Royal | 51 | 12 | 6. Oderbruch | 47 | 14 |

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 52 | 4 | 4. Mensury | 44 | 28 |
| 2. Success | 45 | 40 | 5. Trooper | 43 | 16 |
| 3. Royal | 45 | 20 | 6. Common | 42 | 4 |

### Experimental Farm for Manitoba, Brandon, Man.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 68 | 46 | 4. Trooper | 65 | 10 |
| 2. Nugent | 68 | 26 | 5. Surprise | 65 | 10 |
| 3. Royal | 65 | 30 | 6. Vanguard | 64 | 8 |

### Experimental Farm for the North-west Territories, Indian Head, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rennie's Improved | 62 | 14 | 4. Success | 45 | 40 |
| 2. Odessa | 54 | 28 | 5. Mensury | 43 | 36 |
| 3. Trooper | 45 | 40 | 6. Nugent | 42 | 34 |

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 38 | 36 | 4. Petschora | 33 | 16 |
| 2. Oderbruch | 36 | 27 | 5. Stella | 32 | 4 |
| 3. Trooper | 33 | 46 | 6. Vanguard | 31 | 12 |

The six varieties which have produced the largest crops taking the average of the results obtained on all the experimental farms, and hence may perhaps be regarded as the most promising sorts for general cultivation are:

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 50 | 30 | 4. Royal | 46 | 38 |
| 2. Mensury | 48 | 32 | 5. Common | 43 | 36 |
| 3. Trooper | 47 | 2 | 6. Vanguard | 43 | 28 |

In this latter list of the six most promising varieties for general cultivation, there is found 3 out of the 6 sorts which are first in productiveness at Ottawa, Ont., 5 of the best 6 at Nappan, N. S., 4 of the best 6 at Brandon, Man., 3 of the best 6 at Indian Head, N. W. T., and 3 of the best 6 at Agassiz, B. C.

## SPRING WHEAT.

Thirty-two varieties of spring wheat have been under trial during 1895 the size of the plots were $\frac{1}{10}$th acre each at Brandon and Indian Head, and $\frac{1}{20}$th acre each at Ottawa, Nappan and Agassiz. The quantity of seed sown of each sort was in the proportion of one and a half bushels per acre, and the dates of sowing were as follows: Ottawa, 30th April and 1st May, Nappan, 30th April, Brandon, 16th April, Indian Head, 16th April and Agassiz 19th April.

## UNIFORM TEST PLOTS OF SPRING WHEAT.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1895 | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Preston........... | 30 | 40 | 32 | 20 | 48 | 20 | 45 | 40 | 16 | 40 | 34 | 44 | 96 | 110 | 133 | 138 | 109 | 117⅕ |
| 2 | Goose .... ...... | 28 | 20 | 27 | 40 | 42 | 10 | 33 | 20 | 15 | 20 | 29 | 20 | 103 | 108 | 133 | 135 | 112 | 118⅕ |
| 3 | Old Red River.... | 26 | 30 | 30 | 20 | 47 | 10 | 42 | 40 | 17 | 20 | 32 | 48 | 103 | 115 | 133 | 138 | 109 | 119⅗ |
| 4 | Pringle's Champlain.......... | 26 | 20 | 18 | 20 | 46 | 30 | 44 | 30 | 14 | 40 | 30 | 4 | 98 | 113 | 133 | 136 | 109 | 117⅘ |
| 5 | Huron.... .. .... | 25 | 40 | 31 | .. | ... | ... | 51 | 20 | 17 | 10 | 31 | 17 | 98 | 112 | .... | 138 | 105 | 113¼ |
| 6 | Wellman's Fife.... | 25 | 20 | 25 | 20 | 34 | .. | 42 | 40 | 16 | 40 | 28 | 48 | 103 | 116 | 139 | 138 | 119 | 123 |
| 7 | Dion's... ........ | 24 | 40 | 22 | 40 | 38 | 20 | 43 | 20 | 19 | 15 | 29 | 39 | 100 | 116 | 139 | 135 | 111 | 120⅕ |
| 8 | White Russian.... | 24 | 27 | 28 | .. | 35 | 30 | 36 | 10 | ... | ... | 31 | 2 | 103 | 115 | 139 | 138 | .... | 123¾ |
| 9 | Red Fern......... | 24 | 20 | 31 | .. | 41 | 10 | 42 | 20 | 16 | 40 | 31 | 6 | 100 | 110 | 133 | 138 | 119 | 120 |
| 10 | Monarch ......... | 24 | .. | ... | ... | 36 | 30 | 36 | .. | 15 | 20 | 27 | 57 | 103 | .... | 139 | 138 | 122 | 116⅖ |
| 11 | Alpha............ | 24 | .. | 24 | .. | 40 | 20 | 45 | 30 | 19 | 30 | 30 | 40 | 98 | 109 | 134 | 135 | 106 | 116⅖ |
| 12 | Admiral ......... | 24 | .. | 30 | 40 | 42 | 50 | 35 | 10 | 20 | .. | 30 | 32 | 97 | 114 | 134 | 138 | 111 | 118⅘ |
| 13 | Advance ......... | 24 | .. | 26 | 20 | 46 | 20 | 43 | 50 | 21 | .. | 32 | 18 | 98 | 113 | 134 | 138 | 111 | 118⅘ |
| 14 | Emporium........ | 24 | .. | ... | ... | 39 | 30 | 48 | 40 | 13 | 50 | 31 | 30 | 100 | .... | 133 | 138 | 122 | 123¼ |
| 15 | Percy ............ | 23 | 40 | 28 | 20 | 41 | .. | 39 | 40 | 14 | 20 | 29 | 24 | 97 | 110 | 125 | 135 | 109 | 115⅕ |
| 16 | Red Fife.......... | 23 | 40 | 24 | .. | 49 | .. | 45 | .. | 17 | 25 | 31 | 49 | 101 | 114 | 133 | 136 | 112 | 119⅕ |
| 17 | Colorado ......... | 23 | 20 | 18 | .. | 34 | 10 | 29 | 10 | ... | ... | 26 | 10 | 98 | 114 | 128 | 133 | .... | 118¼ |
| 18 | Blenheim......... | 23 | 10 | 27 | .. | 37 | 20 | 44 | .. | 17 | 10 | 29 | 44 | 98 | 114 | 133 | 138 | 112 | 119 |
| 19 | Stanley .......... | 22 | 43 | 32 | 20 | 43 | 30 | 42 | .. | 13 | 20 | 30 | 47 | 96 | 113 | 133 | 135 | 119 | 119⅕ |
| 20 | White Fife........ | 22 | 39 | 23 | 40 | 46 | 40 | 42 | 10 | 30 | 55 | 33 | 21 | 101 | 116 | 133 | 140 | 120 | 122 |
| 21 | Crown............ | 22 | 30 | 22 | 40 | 42 | 50 | 46 | 40 | 16 | .. | 30 | 8 | 98 | 111 | 130 | 138 | 109 | 117⅕ |
| 22 | Captor .......... | 22 | 10 | 27 | .. | 32 | 30 | 28 | .. | 17 | 50 | 25 | 30 | 95 | 114 | 139 | 136 | 111 | 119 |
| 23 | Ladoga .......... | 21 | 40 | 24 | .. | 42 | 10 | 41 | 35 | 15 | 10 | 28 | 55 | 108 | 108 | 128 | 138 | 104 | 117⅕ |
| 24 | White Connell.... | 21 | 34 | 29 | 20 | 44 | 50 | 35 | 20 | 14 | .. | 29 | 1 | 103 | 114 | 133 | 140 | 122 | 122⅖ |
| 25 | Campbell's White Chaff........... | 20 | 20 | 31 | 40 | 38 | 50 | 40 | 20 | 19 | 10 | 30 | 4 | 99 | 109 | 134 | 136 | 109 | 117⅖ |
| 26 | Rio Grande....... | 20 | 20 | 22 | 40 | 41 | 30 | 41 | 40 | 33 | 10 | 31 | 40 | 105 | 115 | 133 | 135 | 128 | 123⅕ |
| 27 | Beaudry.......... | 19 | 40 | 19 | .. | 25 | 36 | 52 | .. | 22 | 40 | 27 | 47 | 97 | 112 | 130 | 136 | 111 | 117⅕ |
| 28 | Black Sea ....... | 19 | .. | 25 | .. | 38 | 30 | 41 | 10 | .... | .... | 30 | 55 | 93 | 108 | 130 | 136 | .... | 116¾ |
| 29 | Herisson Bearded. | 18 | 20 | 31 | 20 | 41 | 30 | 44 | 40 | 21 | .. | 31 | 22 | 98 | 115 | 139 | 138 | 109 | 119⅘ |
| 30 | Golden Drop...... | 17 | 20 | 30 | 40 | 37 | 50 | 33 | 10 | 16 | 30 | 27 | 6 | 98 | 109 | 128 | 139 | 106 | 116 |
| 31 | Rideau...... .... | 15 | 50 | 25 | 20 | 43 | .. | 43 | 20 | 19 | 30 | 29 | 24 | 95 | 108 | 137 | 136 | 122 | 119⅗ |
| 32 | Gehun .... .. .... | 13 | 40 | 22 | 40 | 42 | 40 | 36 | .. | 14 | 10 | 25 | 50 | 100 | 108 | 126 | 132 | 111 | 115⅖ |

The sowing of Monarch and Emporium at Nappan, Huron at Brandon, and White Russian, Colorado and Black Sea at Agassiz, was omitted, and hence the particulars connected with these varieties are incomplete.

The twelve varieties of spring wheat which have produced the largest crops at the several experimental farms during 1895 are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston.... ..... ........ | 30 | 40 | 7. Dion's..................... | 24 | 40 |
| 2. Goose.. ........ .... . . . | 28 | 20 | 8. White Russian............. | 24 | 27 |
| 3. Old Red River... ....... ... | 26 | 30 | 9. Red Fern.......... ...... .. | 24 | 20 |
| 4. Pringle's Champlain......... | 26 | 20 | 10. Monarch .................. | 24 | |
| 5. Huron....................... | 25 | 40 | 11. Alpha..................... | 24 | |
| 6. Wellman's Fife............ | 25 | 20 | 12. Admiral................... | 24 | |

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 32 | 20 | 7. Admiral | 30 | 40 |
| 2. Stanley | 32 | 20 | 8. Golden Drop | 30 | 40 |
| 3. Campbell's White Chaff | 31 | 40 | 9. White Connell | 29 | 20 |
| 4. Herisson Bearded | 31 | 20 | 10. Percy | 28 | 20 |
| 5. Huron | 31 | | 11. White Russian | 28 | |
| 6. Red Fern | 31 | | 12. Goose | 27 | 40 |

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Fife | 49 | | 7. White Connell | 44 | 50 |
| 2. Preston | 48 | 20 | 8. Stanley | 43 | 30 |
| 3. Old Red River | 47 | 10 | 9. Rideau | 43 | |
| 4. White Fife | 46 | 40 | 10. Admiral | 42 | 50 |
| 5. Pringle's Champlain | 46 | 30 | 11. Crown | 42 | 50 |
| 6. Advance | 46 | 20 | 12. Gehun | 42 | 40 |

### Experimental Farm for the North-west Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaudry | 52 | | 7. Red Fife | 45 | |
| 2. Huron | 51 | 20 | 8. Herisson Bearded | 44 | 40 |
| 3. Emporium | 48 | 40 | 9. Pringle's Champlain | 44 | 30 |
| 4. Crown | 46 | 40 | 10. Blenheim | 44 | |
| 5. Preston | 45 | 40 | 11. Advance | 43 | 50 |
| 6. Alpha | 45 | 30 | 12. Dion's | 43 | 20 |

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rio Grande | 33 | 10 | 7. Alpha | 19 | 30 |
| 2. White Fife | 30 | 55 | 8. Rideau | 19 | 30 |
| 3. Beaudry | 22 | 40 | 9. Dion's | 19 | 15 |
| 4. Advance | 21 | | 10. Campbell's White Chaff | 19 | 10 |
| 5. Herisson Bearded | 21 | | 11. Captor | 17 | 50 |
| 6. Admiral | 20 | | 12. Red Fife | 17 | 25 |

The twelve varieties of spring wheat which have produced the largest crops taking the average of the results obtained on all the experimental farms, and hence may perhaps be regarded as the most promising sorts for general cultivation are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 34 | 44 | 7. Emporium | 31 | 30 |
| 2. White Fife | 33 | 21 | 8. Herisson Bearded | 31 | 22 |
| 3. Old Red River | 32 | 48 | 9. Huron | 31 | 17 |
| 4. Advance | 32 | 18 | 10. Red Fern | 31 | 6 |
| 5. Red Fife | 31 | 49 | 11. White Russian | 31 | 2 |
| 6. Rio Grande | 31 | 40 | 12. Stanley | 30 | 47 |

In this latter list of the twelve varieties of spring wheat which have averaged best at all the experimental farms, there are 5 out of the 12 sorts which are first in productiveness at Ottawa, Ont., 6 of the 12 best at Nappan, N. S., 6 of the 12 best at Brandon, Man., 6 of the 12 best at Indian Head, N. W. T., and 4 of the 12 best at Agassiz, B. C.

In these tests of varieties some of the new cross-bred wheats which have been produced at the experimental farms made a good showing. Preston heads the list in the last and most important series. This is a bearded variety, a cross between Ladoga and Red Fife. The other cross-bred sorts in this select list are Huron and Stanley, both having the same

parentage as Preston, the former is bearded and the latter beardless, and Advance which is a bearded cross of Ladoga with White Fife. The other cross-bred sorts included in the larger list are Monarch, Alpha, Percy and Captor, all beardless sorts, and Admiral, Blenheim, Crown and Rideau all bearded sorts.

## PEASE.

Ten varieties of pease have been under trial during 1895. The size of these plots was the same as those of the spring wheat, and the quantity of seed used per acre varied from two to three bushels depending upon the size of the pea. The dates of sowing were as follows: Ottawa. 3rd and 4th May, Nappan, 2nd May, Brandon. 17th May and Agassiz, 25th April. On account of the mixing of the varieties by a high wind at Indian Head after the plots had been cut, no returns were obtainable from that farm. Three of the plots of pease at Brandon suffered from the same cause and were so badly mixed that no accurate returns could be given. For this reason the report from Brandon covers seven varieties only.

UNIFORM TEST PLOTS OF PEASE.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1895. | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N. S. | | Brandon, Man. | | Agassiz, B. C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N. S. | Brandon, Man. | Agassiz, B. C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. |
| 1 | Black-eyed Marrowfat | 40 | 10 | 53 | 20 | 52 | .. | 22 | 40 | 44 | 32 | 100 | 113 | 116 | 116 | 111¼ |
| 2 | Mummy | 39 | 30 | 40 | .. | 53 | 10 | 22 | 50 | 38 | 52 | 99 | 103 | 109 | 120 | 107¾ |
| 3 | Pride | 39 | .. | 43 | 40 | 68 | .. | 20 | .. | 42 | 40 | 96 | 95 | 97 | 110 | 99½ |
| 4 | Prince Albert | 36 | 20 | 42 | 20 | .. | .. | 25 | 5 | 34 | 35 | 108 | 108 | .... | 127 | 114⅓ |
| 5 | Centennial | 34 | 40 | 42 | 40 | .. | .. | 21 | .. | 32 | 47 | 101 | 97 | ... | 127 | 108⅓ |
| 6 | Crown | 33 | 30 | 55 | 52 | 60 | 50 | 26 | 25 | 44 | 12 | 97 | 96 | 99 | 116 | 102 |
| 7 | New Potter | 33 | .. | 47 | 20 | 56 | 40 | 22 | 30 | 39 | 52 | 99 | 104 | 105 | 120 | 107 |
| 8 | Multiplier | 31 | 50 | 41 | 40 | .. | .. | 33 | 20 | 35 | 37 | 101 | 110 | .... | 127 | 112⅔ |
| 9 | Golden Vine | 30 | 30 | 41 | .. | 46 | 20 | 28 | 20 | 36 | 32 | 97 | 97 | 103 | 120 | 104¼ |
| 10 | Canadian Beauty | 30 | 20 | 47 | 40 | 39 | .. | .. | .. | 39 | .. | 101 | 110 | 104 | .... | 105 |

The six varieties of pease which have produced the largest crops at the several experimental farms during 1895 are the following:

### Central Experimental Farm, Ottawa, Ont.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Black-eyed Marrowfat | 40 | 10 | 4. Prince Albert | 36 | 20 |
| 2. Mummy | 39 | 30 | 5. Centennial | 34 | 40 |
| 3. Pride | 39 | | 6. Crown | 33 | 30 |

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 55 | 62 | 4. New Potter | 47 | 20 |
| 2. Black-eyed Marrowfat | 53 | 20 | 5. Pride | 43 | 40 |
| 3. Canadian Beauty | 47 | 40 | 6. Centennial | 42 | 40 |

### Experimental Farm for Manitoba, Brandon, Man.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pride | 68 | | 4. Mummy | 53 | 10 |
| 2. Crown | 60 | 50 | 5. Black-eyed Marrowfat | 52 | |
| 3. New Potter | 56 | 40 | 6. Golden Vine | 46 | 20 |

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Multiplier | 33 | 20 | 4. Prince Albert | 25 | 5 |
| 2. Golden Vine | 28 | 20 | 5. Prussian Blue | 24 | 40 |
| 3. Crown | 26 | 25 | 6. Mummy | 22 | 50 |

The six varieties of pease which have produced the largest crops taking the average of the results obtained on all the experimental farms are:

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Black-eyed Marrowfat | 44 | 32 | 4. New Potter | 39 | 52 |
| 2. Crown | 44 | 12 | 5. Canadian Beauty | 39 | |
| 3. Pride | 42 | 40 | 6. Mummy | 38 | 52 |

## INDIAN CORN.

Seventeen varieties of Indian corn have been under trial during 1895, all planted on the same day, in rows or hills three feet apart, on similar soil. The dates of planting were as follows :—Ottawa, Ont., 23rd May; Nappan, N.S., 18th May; Brandon, Man., 23rd May; Indian Head, N.W.T., 21st May, and Agassiz, B.C., 23rd May. All were cut green and put into the silo for winter feeding, the dates of cutting were :—Ottawa, Ont., 16th Sept.; Nappan, N.S., 14th Sept.; Brandon, Man., 9th Sept.; Indian Head, N.W.T., 23rd Aug.; Agassiz, B.C., 22nd Sept. The yield per acre has been calculated in each case from the weight obtained from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF INDIAN CORN.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1895. Ottawa, Ont. Tons. | Ottawa, Ont. Lbs. | Nappan, N.S. Tons. | Nappan, N.S. Lbs. | Brandon, Man. Tons. | Brandon, Man. Lbs. | Indian Head, N.W.T. Tons. | Indian Head, N.W.T. Lbs. | Agassiz, B.C. Tons. | Agassiz, B.C. Lbs. | Average of all Farms. Tons. | Average of all Farms. Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Rural Thoroughbred White Flint.. | 37 | 470 | 19 | 500 | 13 | 500 | 6 | ... | 12 | 860 | 17 | 1,265 |
| 2 | Giant Prolific Ensilage Sweet...... | 28 | 1,970 | 11 | 1,650 | 13 | 1,500 | 6 | 600 | 5 | 1,440 | 13 | 632 |
| 3 | Sanford Flint.................... | 23 | 1,300 | 12 | 640 | 13 | 1,500 | 5 | 800 | 6 | 1,340 | 12 | 716 |
| 4 | Canada White Flint............. | 23 | 750 | 11 | 1,100 | 14 | 600 | 6 | ... | 6 | 760 | 12 | 642 |
| 5 | Champion White Pearl Dent..... | 23 | 200 | 12 | 200 | 11 | 500 | 6 | 600 | 7 | 80 | 11 | 1,916 |
| 6 | Red Cob Ensilage................ | 22 | 1,320 | 14 | 600 | 15 | 250 | 6 | 1,800 | 6 | 1,640 | 13 | 322 |
| 7 | New White Cap Yellow Dent..... | 22 | 990 | 12 | 750 | 12 | 640 | 5 | 800 | 10 | 680 | 12 | 1,172 |
| 8 | Country Gentleman.... ......... | 18 | 400 | 15 | 250 | 9 | 1,800 | 5 | 200 | 12 | 200 | 12 | 170 |
| 9 | North Dakota..................... | 18 | 520 | 9 | 1,250 | 11 | 1,650 | 5 | 800 | 5 | 1,980 | 10 | 440 |
| 10 | Comptons's Early................. | 17 | 1,200 | 12 | 1,300 | 15 | 1,800 | 6 | 1,200 | 6 | 320 | 11 | 1,564 |
| 11 | Angel of Midnight................ | 17 | 100 | 17 | 100 | 14 | 600 | 8 | 800 | 9 | 920 | 13 | 504 |
| 12 | Mammoth 8-rowed Flint......... | 15 | 1,900 | 11 | 1,100 | 12 | 200 | 9 | 500 | 6 | 1,200 | 11 | 380 |
| 13 | Longfellow...................... | 15 | 1,680 | 12 | 750 | 14 | 50 | 8 | 200 | 7 | 300 | 11 | 996 |
| 14 | Canadian Dent.............. ... | 14 | 1,150 | 8 | 1,050 | 11 | 1,100 | 4 | 400 | 5 | 560 | 8 | 1,652 |
| 15 | Extra Early Huron Dent.......... | 14 | 1,150 | 12 | 640 | 11 | ... | 6 | ... | 7 | 520 | 10 | 462 |
| 16 | Pearce's Prolific................. | 14 | 50 | 9 | 1,250 | 9 | 1,800 | 3 | 1,200 | 7 | 740 | 8 | 1,808 |
| 17 | Mitchell's Early.................. | 13 | 1,280 | 8 | 500 | 13 | 1,500 | 6 | 600 | 4 | 800 | 9 | 536 |

The six varieties of Indian corn which have given the heaviest crops at the several experimental farms during 1895 are the following:—

*Central Experimental Farm, Ottawa Ont.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Rural Thoroughbred White Flint........ | 37 | 470 |
| 2. Giant Prolific Ensilage Sweet............ | 28 | 1,970 |
| 3. Sanford Flint............................... | 23 | 1,300 |
| 4. Canada White Flint........................ | 23 | 750 |
| 5. Champion White Pearl Dent............... | 23 | 200 |
| 6. Red Cob Ensilage.............................. | 22 | 1,320 |

*Experimental Farm for the Maritime Provinces, Nappan, N. S.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Rural Thoroughbred White Flint........ | 19 | 500 |
| 2. Angel of Midnight.......................... | 17 | 100 |
| 3. Country Gentleman.......................... | 15 | 250 |
| 4. Red Cob Ensilage.............................. | 14 | 600 |
| 5. Comptons Early............................... | 12 | 1,300 |
| 6. New White Cap Yellow Dent............ | 12 | 750 |

*Experimental Farm for Manitoba, Brandon, Man.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Compton's Early.............................. | 15 | 800 |
| 2. Red Cob Ensilage.............................. | 15 | 250 |
| 3. Angel of Midnight............................ | 14 | 600 |
| 4. Canada White Flint.......................... | 14 | 600 |
| 5. Longfellow...................................... | 14 | 50 |
| 6. Sanford Flint.................................. | 13 | 1,500 |

*Experimental Farm for the North-west Territories, Indian Head, N. W. T.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Longfellow | 6 | 1,200 |
| 2. Canada White Flint | 6 | 600 |
| 3. Angel of Midnight | 6 | |
| 4. Champion White Pearl Dent | 5 | 1,400 |
| 5. Country Gentleman | 5 | 1,200 |
| 6. Mitchell's Early | 5 | 800 |

*Experimental Farm for British Columbia, Agassiz, B. C.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Rural Thoroughbred White Flint | 12 | 860 |
| 2. Country Gentleman | 12 | 200 |
| 3. New White Cap Yellow Dent | 10 | 680 |
| 4. Angel of Midnight | 9 | 920 |
| 5. Pearce's Prolific | 7 | 740 |
| 6. Extra Early Huron Dent | 7 | 520 |

The six varieties of Indian corn which have given the heaviest crops taking the average of the results obtained on all the experimental farms are:—

| | Tons. | Lbs. |
|---|---|---|
| 1. Rural Thoroughbred White Flint | 17 | 1,265 |
| 2. Giant Prolific Ensilage Sweet | 13 | 632 |
| 3. Angel of Midnight | 13 | 504 |
| 4. Red Cob Ensilage | 13 | 322 |
| 5. New White Cap Yellow Dent | 12 | 1,172 |
| 6. Sanford Flint | 12 | 716 |

## TURNIPS.

Twelve varieties of turnips have been under trial during 1895 all sown on drills or on the flat $2\frac{1}{2}$ feet apart. Two sowings were made at each farm about two weeks apart. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows. Ottawa, Ont., 8th October; Nappan, N. S., 21st October; Brandon, Man., 5th October; Indian Head, N.W.T., 4th October and Agassiz, B.C., 5th Nov. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 11. | | Sown June 12. | | Sown May 25. | | Sown June 8. | | Sown May 22. | | Sown June 8. | | Sown May 25. | | Sown June 4. | | Sown May 20. | | Sown June 3. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Hartley's Bronze | 13 | 400 | 5 | 1,088 | 30 | 800 | 41 | 1,125 | 17 | 320 | 14 | 776 | 17 | 1,280 | 14 | 620 | 13 | 576 | 12 | 816 | 18 | 675 | 17 | 1,725 |
| 2 | Lord Derby | 12 | 1,080 | 13 | 1,720 | 35 | 1,250 | 31 | 700 | 14 | 1,304 | 11 | 704 | 17 | 500 | 14 | 1,280 | 10 | 1,120 | 9 | 1,712 | 18 | 251 | 16 | 423 |
| 3 | East Lothian | 11 | 1,034 | 6 | 1,728 | 33 | 975 | 28 | 1,470 | 14 | 1,568 | 13 | 928 | 18 | 1,200 | 11 | 800 | 13 | 400 | 8 | 896 | 18 | 635 | 13 | 1,618 |
| 4 | Elephants Master | 10 | 1,186 | 15 | 624 | 33 | 975 | 28 | 1,000 | 10 | 328 | 12 | 1,080 | 14 | 800 | 9 | 1,200 | 6 | 1,200 | 6 | 1,024 | 15 | 98 | 14 | 986 |
| 5 | Purple Top Swede | 9 | 546 | 12 | 24 | 34 | 1,825 | 29 | 1,375 | 18 | 432 | 14 | 1,040 | 16 | 1,120 | 15 | .... | 8 | 544 | 8 | 1,600 | 17 | 893 | 16 | 8 |
| 6 | Imperial Swede | 9 | 480 | 14 | 908 | 28 | 1,950 | 26 | 725 | 12 | 552 | 13 | 400 | 17 | 1,040 | 12 | 1,920 | 8 | 1,248 | 7 | 1,840 | 15 | 651 | 14 | 1,959 |
| 7 | Carter's Elephant | 8 | 1,688 | 13 | 1,984 | 28 | 1,000 | 30 | 800 | 17 | 1,376 | 11 | 440 | 16 | 1,600 | 11 | 1,640 | 12 | 1,344 | 8 | 720 | 16 | 1,802 | 15 | 1,517 |
| 8 | Skirving's Swede | 8 | 1,424 | 14 | 776 | 33 | 500 | 26 | 725 | 17 | 320 | 15 | 360 | 20 | 800 | 12 | .... | 9 | 1,008 | 8 | 1,428 | 17 | 1,610 | 15 | 658 |
| 9 | Champion Purple Top | 8 | 632 | 17 | 904 | 28 | 1,950 | 36 | 200 | 13 | 400 | 11 | 440 | 10 | 1,120 | 9 | 1,260 | 11 | 1,232 | 10 | 1,120 | 14 | 1,067 | 17 | 5 |
| 10 | Giant King | 8 | 38 | 12 | 288 | 30 | 325 | 23 | 740 | .... | .... | .... | .... | 13 | 160 | 10 | 820 | 7 | 80 | 6 | 1,728 | 14 | 1,151 | 13 | 394 |
| 11 | Jumbo or Monarch | 7 | 1,312 | 10 | 64 | 28 | 523 | 33 | 1,450 | 21 | 1,560 | 13 | 400 | 17 | 1,040 | 12 | .... | 10 | 64 | 11 | 1,760 | 17 | 100 | 16 | 335 |
| 12 | Prize Purple Top | 6 | 408 | 8 | 1,160 | 33 | 500 | 24 | 1,870 | 13 | 1,720 | 13 | 400 | 17 | 560 | 12 | 1,200 | 12 | 640 | 11 | 1,232 | 16 | 1,166 | 14 | 372 |

The Giant King Swede was omitted at Brandon for the reason that the seed did not arrive in time for sowing. The crops from the successive sowings of turnips at the several experimental farms have averaged as follows:

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., first sowing, May 11 | 9 | 1,019 |
| do do do second sowing, June 12 | 12 | 106 |
| Experimental Farm, Nappan, N.S., first sowing, May 25 | 31 | 1,214 |
| do do second sowing, June 8 | 30 | 317 |
| Experimental Farm, Brandon, Man., first sowing, May 22 | 15 | 990 |
| do do second sowing, June 8 | 13 | 90 |
| Experimental Farm, Indian Head, N.W.T., first sowing, May 25 | 16 | 935 |
| do do second sowing, June 4 | 12 | 395 |
| Experimental Farm, Agassiz, B.C., first sowing, May 20 | 10 | 621 |
| do do second sowing June 3 | 9 | 656 |

The six varieties of turnips which have produced the heaviest crops during the past season at the several experimental farms are the following:—

*Central Experimental Farm, Ottawa.*

The yields at Ottawa have been light, due mainly to the prevalence of rot, which has injured the crop here for several years past.

| | Tons. | Lbs. |
|---|---|---|
| 1. Champion Purple Top, 2nd sowing.. | 17 | 904 |
| 2. Elephants Master " .. | 15 | 624 |
| 3. Imperial Swede " .. | 14 | 908 |
| 4. Skirving's Swede " .. | 14 | 776 |
| 5. Carter's Elephant " .. | 13 | 1,984 |
| 6. Lord Derby " .. | 13 | 1,720 |

*Experimental Farm for the Maritime Provinces, Nappan, N.S.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Hartley's Bronze, 2nd sowing.......... | 41 | 1,125 |
| 2. Champion Purple Top, 2nd sowing...... | 36 | 200 |
| 3. Lord Derby, 1st " ...... | 35 | 1,250 |
| 4. Purple Top Swede, 1st " ...... | 34 | 1,825 |
| 5. Jumbo or Monarch 2nd " ...... | 33 | 1,450 |
| 6. East Lothian 2nd " ...... | 33 | 975 |

*Experimental Farm for Manitoba, Brandon, Man.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Jumbo or Monarch, 1st sowing...... ..... | 21 | 1,560 |
| 2. Purple Top Swede " ............ | 18 | 432 |
| 3. Carter's Elephant " .. ........ | 17 | 1,376 |
| 4. Hartley's Bronze " ........ ... | 17 | 320 |
| 5. Skirving's Swede " ............ | 17 | 320 |
| 6. East Lothian " ........... | 14 | 1,568 |

*Experimental Farm for the North-west Territories, Indian Head, N.W.T.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Skirving's Swede, 1st sowing..... ....... | 20 | 800 |
| 2. East Lothian " ....... ..... | 18 | 1,200 |
| 3. Hartley's Bronze " ............. | 17 | 1,280 |
| 4. Imperial Swede, " ............. | 17 | 1,040 |
| 5. Jumbo or Monarch " ........... | 17 | 1,040 |
| 6. Prize Purple Top " ............. | 17 | 560 |

*Experimental Farm for British Columbia, Agassiz, B.C.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Hartley's Bronze, 1st sowing..... ....... | 13 | 576 |
| 2. East Lothian " .......... | 13 | 400 |
| 3. Carter's Elephant " ..... ....... | 12 | 1,344 |
| 4. Hartley's Bronze 2nd sowing............ | 12 | 816 |
| 5. Prize Purple Top, 1st " ............ | 12 | 640 |
| 6. Champion Purple Top, 1st sowing..... | 11 | 1,232 |

The six varieties of turnips which have produced the heaviest crops taking the average of the results obtained on all the experimental farms, are :—

| | | | Tons. | Lbs. |
|---|---|---|---|---|
| 1. Hartley's Bronze, | 1st sowing | ............ | 18 | 675 |
| 2. East Lothian | " | ............ | 18 | 635 |
| 3. Lord Derby | " | ............ | 18 | 251 |
| 4. Skirving's Swede | " | ............ | 17 | 1,610 |
| 5. Purple Top Swede | " | ............ | 17 | 893 |
| 6. Jumbo or Monarch | " | ............ | 17 | 100 |

## MANGELS.

Twelve varieties of mangels have been under trial during 1895, all sown in rows on the flat, 2½ feet apart. Two sowings were made, the second sowing about two weeks after the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows:—Ottawa, 8th October; Nappan, 19th October; Brandon, 30th September; Indian Head, 25th September and Agassiz 30th October. The yield per acre has been calculated from the weight of roots gathered from two rows each 66 feet long.

The Canadian Giant mangel was not reported on at Nappan, N. S., nor at Indian Head N. W. T.

## UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | May 11. | May 25. | May 25. | June 8. | May 22. | June 8. | May 25. | June 4. | April 27. | May 11. | 1st Sowing | 2d Sowing |
| | | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. |
| 1 | Mamm. Long Red (Evans) | 37 976 | 22 880 | 21 1,700 | 20 1,800 | 36 864 | 28 1,024 | 13 160 | 12 560 | 24 643 | 18 960 | 26 1,269 | 20 1,045 |
| 2 | Red Fleshed Tankard...... | 33 528 | 19 1,336 | 24 165 | 15 875 | 21 1,032 | 15 1,680 | 12 720 | 11 1,910 | 26 800 | 26 624 | 23 1,049 | 17 1,691 |
| 3 | Mamm. Long Red (Sharpe) | 32 1,208 | 19 1,666 | 16 775 | 23 75 | 25 1,744 | 21 1,560 | 10 1,360 | 9 480 | 15 1,856 | 20 1,516 | 20 589 | 18 1,859 |
| 4 | Giant Yellow Intermediate | 31 634 | 19 1,600 | 35 965 | 29 1,850 | 31 304 | 19 544 | 12 680 | 12 | 22 192 | 28 320 | 26 955 | 21 1,663 |
| 5 | Champion Yellow Globe.... | 29 1,400 | 19 16 | 17 1,625 | 23 1,975 | 22 1,408 | 16 1,528 | 10 680 | 10 400 | 23 1,520 | 21 1,296 | 20 1,726 | 18 643 |
| 6 | Mamm. Long Red (Webb) | 29 146 | 16 1,066 | 19 950 | 24 450 | 28 1,024 | 26 800 | 16 880 | 12 600 | 32 416 | 17 1,200 | 25 283 | 19 823 |
| 7 | Canadian Giant ........... | 28 1,288 | 23 1,520 | .... .... | ........ | 29 400 | 26 1,856 | ......... | ... ... | 27 1,440 | 25 1,216 | 28 1,043 | 25 864 |
| 8 | Conqueror Yellow Globe... | 28 1,090 | 17 848 | 21 1,415 | 17 1,150 | 30 456 | 21 1,560 | 12 1,200 | 12 600 | 21 768 | 15 1,680 | 22 1,786 | 16 1,967 |
| 9 | Gate Post...... .......... | 27 1,176 | 17 1,376 | 22 175 | 21 1,600 | 30 192 | 23 1,256 | 9 240 | 12 | 26 800 | 21 416 | 23 117 | 19 529 |
| 10 | Red Fleshed Globe ........ | 24 1,896 | 22 880 | 10 1,375 | 15 400 | 25 160 | 22 1,672 | 9 1,680 | 9 600 | 31 832 | 16 1,792 | 20 788 | 17 669 |
| 11 | Warden Orange Globe..... | 24 1,368 | 16 208 | 19 475 | 16 15 | 20 128 | 14 1,568 | 11 40 | 8 1,920 | 22 1,408 | 27 560 | 19 1,084 | 16 1,254 |
| 12 | Golden Tankard..... ..... | 22 682 | 17 1,640 | 32 790 | 30 800 | 24 1,632 | 23 992 | 16 400 | 15 | 26 1,856 | 21 240 | 24 1,072 | 21 1,134 |

The crops from the successive sowings of mangels at the several experimental farms have averaged as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., 1st sowing.......... | 29 | 366 |
| do do 2nd sowing.......... | 19 | 753 |
| Experimental Farm, Nappan, N.S., 1st sowing.......... | 21 | 1,855 |
| do do 2nd sowing.......... | 21 | 1,363 |
| do Brandon, Man., 1st sowing.......... | 27 | 278 |
| do do 2nd sowing.......... | 21 | 1,670 |
| do Indian Head, N.W.T., 1st sowing.......... | 12 | 367 |
| do do 2nd sowing.......... | 11 | 827 |
| do Agassiz, B.C., 1st sowing.......... | 25 | 1,879 |
| do do 2nd sowing.......... | 21 | 1,483 |

It will be seen that the earlier sowings have in every instance given the largest crop.

The six varieties of mangels which have produced the heaviest crods during the past season at the several experimental farms are the following :—

*Central Experimental Farm, Ottawa, Ont.*

| | | Tons. | Lbs. |
|---|---|---|---|
| 1 Mammoth Long Red (Evans) | 1st sowing | 37 | 976 |
| 2 Red Fleshed Tankard | " ...... | 33 | 528 |
| 3 Mammoth Long Red (Sharpe) | " ...... | 32 | 1,208 |
| 4 Giant Yellow Intermediate | " ...... | 31 | 634 |
| 5 Champion Yellow Globe | " ...... | 29 | 1,400 |
| 6 Mammoth Long Red (Webb) | " ...... | 29 | 146 |

*Experimental Farm for the Maritime Provinces, Nappan, N. S.*

| | | Tons. | Lbs. |
|---|---|---|---|
| 1 Giant Yellow Intermediate | 1st sowing | 35 | 965 |
| 2 Golden Tankard | " ...... | 32 | 790 |
| 3 Mammoth Long Red (Webb) | 2nd sowing | 24 | 450 |
| 4 Red Fleshed Tankard | 1st " ...... | 24 | 165 |
| 5 Champion Yellow Globe | 2nd " ...... | 23 | 1,975 |
| 6 Mammoth Long Red (Sharpe) | " ...... | 23 | 75 |

*Experimental Farm for Manitoba, Brandon, Man.*

| | | Tons. | Lbs. |
|---|---|---|---|
| 1 Mammoth Long Red (Evans) | 1st sowing | 36 | 864 |
| 2 Giant Yellow Intermediate | " ...... | 31 | 304 |
| 3 Conqueror Yellow Globe | " ...... | 30 | 456 |
| 4 Gate Post | " ...... | 30 | 192 |
| 5 Canadian Giant | " ...... | 29 | 400 |
| 6 Mammoth Long Red (Webb) | " ...... | 28 | 1,024 |

*Experimental Farm for the North-west Territories, Indian Head, N.W.T.*

| | | | Tons. | Lbs. |
|---|---|---|---|---|
| 1 Mammoth Long Red (Webb), | 1st | sowing | 16 | 880 |
| 2 Golden Tankard, | " | " | 16 | 400 |
| 3 Mammoth Long Red (Evans), | " | " | 13 | 160 |
| 4 Conqueror Yellow Globe, | " | " | 12 | 1200 |
| 5 Red Fleshed Tankard, | " | " | 12 | 720 |
| 6 Giant Yellow Intermediate, | " | " | 12 | 680 |

*Experimental Farm for British Columbia, Agassiz, B.C.*

| | | | Tons. | Lbs. |
|---|---|---|---|---|
| 1 Mammoth Long Red (Webb), | 1st | sowing | 32 | 416 |
| 2 Red Fleshed Globe, | " | " | 31 | 832 |
| 3 Giant Yellow Intermediate, | 2nd | " | 28 | 320 |
| 4 Canadian Giant, 1st sowing......... ....... | | | 27 | 1440 |
| 5 Warden Orange Globe, 2nd sowing....... | | | 27 | 560 |
| 6 Golden Tankard, 1st sowing............... | | | 26 | 1856 |

The six varieties of mangels which have produced the heaviest crops, taking the average of the results obtained at all the experimental farms are the following:—

| | Tons. | Lbs. |
|---|---|---|
| 1 Canadian Giant, 1st sowing.................. | 28 | 1043 |
| 2 Mammoth Long Red (Evans), 1st sowing. | 26 | 1269 |
| 3 Giant Yellow Intermediate, " " | 26 | 955 |
| 4 Mammoth Long Red (Webb), " " | 25 | 283 |
| 5 Golden Tankard, " " | 24 | 1072 |
| 6 Red Fleshed Tankard, " " | 23 | 1049 |

## CARROTS.

Twelve varieties of carrots have been under test during 1895, all sown in rows on the flat, two feet apart. Two sowings were made, the second sowing about two weeks after the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows:—Ottawa, 8th October; Nappan, 21st October; Brandon, 3rd October; Indian Head, 16th October and Agassiz, 28th October. The yield per acre has been calculated from the weight of roots gathered from two rows, each 66 feet long.

UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | May 11. | May 25. | May 25. | June 8. | May 21. | June 8. | May 14. | April 27. | May 11. | 1st Sowing. | 2nd Sowing. |
| | | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. |
| 1 | Mammoth White Intermediate........ | 29 1,400 | 25 820 | 21 275 | 13 155 | 18 1,840 | 11 440 | 7 400 | 30 720 | 23 347 | 21 927 | 18 440 |
| 2 | Improved Half-Long White........... | 27 1,935 | 23 1,520 | 19 950 | 15 1,825 | 17 320 | 11 880 | 8 80 | 17 1,787 | 14 1,333 | 18 214 | 16 889 |
| 3 | Iverson's Champion ..... ........... | 26 1,130 | 26 1,295 | 20 1,800 | 15 1,825 | 14 600 | 10 680 | 9 1,200 | 8 1,600 | 9 1,947 | 16 66 | 15 1,437 |
| 4 | Early Gem. .... .. ................ | 24 262 | 14 1,782 | 19 190 | 6 1,775 | 11 1,760 | 13 1,720 | 7 400 | 19 1,848 | 21 827 | 16 892 | 14 526 |
| 5 | Selected White Belgian............ | 23 730 | 14 50 | 13 125 | 10 425 | 11 .... | 15 360 | 8 1,760 | ... .... | ..... .... | 14 104 | 13 278 |
| 6 | Carter's Orange Giant................ | 23 282 | .......... | 20 565 | 8 150 | 11 1,760 | 15 360 | 8 800 | 19 720 | 13 1,867 | 16 1,225 | 12 792 |
| 7 | Giant Short White Vosges............ | 22 1,870 | 20 260 | 8 1,765 | 14 975 | 14 600 | 14 600 | 9 960 | 19 1,600 | 17 613 | 15 159 | 16 1,112 |
| 8 | Improved Short White........ ..... | 22 880 | 20 1,580 | 24 1,400 | 9 525 | 15 360 | 13 840 | 7 1,600 | 25 160 | 14 226 | 19 80 | 14 790 |
| 9 | Yellow Intermediate ................. | 21 570 | .......... | 18 1,050 | 9 1,950 | 10 680 | 6 1,200 | 8 1,280 | 15 680 | 11 880 | 14 1,652 | 9 676 |
| 10 | Long Scarlet Altringham.............. | 25 1,020 | 9 1,140 | 14 1,925 | 5 450 | 9 40 | 9 480 | ... .... | 18 961 | 15 1,213 | 14 986 | 10 71 |
| 11 | Long Orange or Surrey........... .. | 11 1,100 | 7 932 | 11 325 | 5 450 | 9 480 | 11 440 | 8 800 | 17 1,787 | 12 1,813 | 11 1,298 | 9 409 |
| 12 | Scarlet Intermediate........... .... | .......... | .......... | 11 1,275 | 11 1,275 | 10 240 | 9 40 | 8 1,280 | .......... | .......... | 10 265 | 10 657 |

The second series of plots were not sown at Indian Head, N.W.T., and the Long Scarlet Altringham was omitted from the first series on account of delay in receiving the seed. For the same reason both sowings of Selected White Belgian and Scarlet Intermediate were omitted at Agassiz. In the second sowing of Carter's Orange Giant and Yellow Intermediate at Ottawa, the seed did not germinate well and many of the young plants were destroyed by insects so that no reliable returns could be given. Both sowings of Scarlet Intermediate were accidentally omitted.

The crops from the successive sowings of carrots at the several experimental farms have averaged as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., 1st sowing...... | 22 | 1,089 |
| do do 2nd sowing..... | 18 | 153 |
| Experimental Farm, Nappan, N.S., 1st sowing........... | 16 | 1,970 |
| do do 2nd sowing .. ..... | 10 | 982 |
| do Brandon, Man., 1st sowing........... | 12 | 1,557 |
| Experimental Farm, Brandon, Man., 2nd sowing .......... | 11 | 1,503 |
| do Indian Head, N.W.T., 1st sowing..... | 8 | 778 |
| do Agassiz, B.C., 1st sowing.... ........ | 19 | 586 |
| do do 2nd sowing...... ... | 15 | 907 |

It will be seen that the earlier sowings in carrots also have given the largest crops.

The six varieties of carrots which have given the heaviest crops during the season of 1895 at the several experimental farms are the following:—

*Central Experimental Farm, Ottawa, Ont.*

| | | Tons. | Lbs. |
|---|---|---|---|
| 1 Mammoth White Intermediate | 1st sowing | 29 | 1,400 |
| 2 Improved Half-long White | " " ... | 27 | 1,935 |
| 3 Iverson's Champion | 2nd " ... | 26 | 1,295 |
| 4 Early Gem | 1st " ... | 24 | 262 |
| 5 Selected White Belgian | " " ... | 23 | 530 |
| 6 Carter's Orange Giant | " " ... | 23 | 282 |

*Experimental Farm for the Maritime Provinces, Nappan, N. S.*

| | Tons. | Lbs. |
|---|---|---|
| 1 Improved Short White, 1st sowing........ | 24 | 1,400 |
| 2 Mamm. White Intermediate, 1st sowing. | 21 | 275 |
| 3 Iverson's Champion, 1st sowing........... | 20 | 1,800 |
| 4 Carter's Orange Giant " .......... | 20 | 565 |
| 5 Improved Half-long White, 1st sowing.. | 19 | 950 |
| 6 Early Gem, 1st sowing ..................... | 19 | 190 |

*Experimental Farm for Manitoba, Brandon, Man.*

| | Tons. | Lbs. |
|---|---|---|
| 1 Mamm. White Intermediate, 1st sowing. | 18 | 1,840 |
| 2 Improved Half-long White 1st sowing... | 17 | 320 |
| 3 Improved Short White, 1st sowing....... | 15 | 360 |
| 4 Selected White Belgian, 2nd sowing...... | 15 | 360 |
| 5 Carter's Orange Giant " ...... | 15 | 360 |
| 6 Iverson's Champion 1st sowing........... | 14 | 600 |

*Experimental Farm for the North-west Territories, Indian Head, N. W.T.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Iverson's Champion, 1st sowing........... | 9 | 1,200 |
| 2. Giant Short White Vosges, 1st sowing. | 9 | 960 |
| 3. Selected White Belgian " ... | 8 | 1,760 |
| 4. Yellow Intermediate " ... | 8 | 1,280 |
| 5. Scarlet Intermediate " ... | 8 | 1,280 |
| 6. Carter's Orange Giant " ... | 8 | 800 |

*Experimental Farm for British Columbia, Agassiz, B.C.*

| | Tons. | Lbs. |
|---|---|---|
| 1. Mamm. White Intermediate, 1st sowing. | 30 | 720 |
| 2. Improved Short White, 1st sowing...... | 25 | 160 |
| 3. Early Gem 2nd " ...... | 21 | 827 |
| 4. Giant Short White Vosges, 1st sowing. | 19 | 1,600 |
| 5. Carter's Orange Giant " ... | 19 | 720 |
| 6. Long Scarlet Altringham " ... | 18 | 961 |

The six varieties of carrots which have produced the heaviest crops in 1895, taking the average of the results obtained at all the experimental farms are the following:—

| | | | Tons. | Lbs. |
|---|---|---|---|---|
| 1. Mamm. White Intermediate, | 1st | sowing | 21 | 927 |
| 2. Improved Short White | " | " | 19 | 80 |
| 3. Improved Half-long White | " | " | 18 | 214 |
| 4. Carter's Orange Giant | " | " | 16 | 1,225 |
| 5. Giant Short White | 2nd | " | 16 | 1,112 |
| 6. Early Gem | 1st | " | 16 | 892 |

## POTATOES.

Sixty-two varieties of potatoes were under trial in uniform plots during 1895. The potatoes for planting were cut into pieces with two or three eyes in each, and these were planted in rows 2½ feet apart, the sets being about a foot apart in the rows. At Ottawa, Ont., the potatoes were planted 22nd to 25th May, and dug 2nd October; at Nappan, N.S., planted 23rd May, dug 24th and 25th September; at Brandon, Man., planted 28th May, dug 28th September; at Indian Head, N.W.T., planted 15th May, dug 4th October, and at Agassiz, B.C., planted 21st May, dug 11th to 14th October. The yield per acre has been calculated from the weight of tubers gathered from two rows each 66 feet long.

UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Ottawa, Ont, Per acre. | | Nappan, N. S. Per acre. | | Brandon, Man. Per acre. | | Indian Head, N. W. T. Per acre. | | Agassiz, B.C. Per acre. | | Average of all Farms. Per acre. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs |
| 1 | American Wonder.... | 385 | .. | 340 | .. | ....... | | 176 | .. | 88 | .. | 247 | 15 |
| 2 | Rochester Rose..... | 381 | 8 | 330 | .. | 282 | 20 | 272 | .. | 164 | 16 | 285 | 57 |
| 3 | Early Norther ....... | 378 | 24 | 260 | .. | 392 | 20 | 204 | .. | 164 | 16 | 279 | 48 |
| 4 | Irish Daisy........... | 366 | 37 | 325 | .. | 275 | .. | 196 | .. | 176 | .. | 267 | 43 |
| 5 | Early White Prize.... | 363 | .. | 255 | .. | 326 | 30 | 280 | .. | 244 | 34 | 293 | 45 |
| 6 | New Queen........... | 363 | .. | 250 | .. | 311 | 40 | 152 | .. | 129 | 4 | 241 | 9 |
| 7 | Late Puritan......... | 355 | 44 | 320 | .. | 322 | 40 | 288 | .. | 281 | 36 | 313 | 36 |
| 8 | Early Harvest........ | 353 | 55 | 325 | .. | 359 | 20 | 296 | .. | 183 | 20 | 303 | 31 |
| 9 | Thorburn ..... ...... | 352 | .. | 170 | .. | 363 | .. | 188 | .. | 183 | 20 | 251 | 16 |
| 10 | I. X. L ......... ... | 347 | 36 | 282 | 30 | 271 | 20 | 176 | .. | 124 | 40 | 240 | 25 |
| 11 | Empire State......... | 347 | 36 | 340 | .. | 341 | .. | 248 | .. | 190 | 40 | 293 | 27 |
| 12 | Clarke's No. 1........ | 341 | .. | 336 | 15 | 286 | .. | 224 | .. | 148 | 8 | 267 | 5 |
| 13 | Early Rose.......... | 327 | 48 | 260 | .. | 352 | .. | 180 | .. | 187 | 34 | 261 | 28 |
| 14 | Everett ......... .. . | 323 | 24 | 260 | .. | 348 | 20 | 264 | .. | 73 | 20 | 253 | 49 |
| 15 | Monroe County. .... | 321 | 12 | 297 | 30 | ..... | .... | 260 | . | 73 | 20 | 238 | .. |
| 16 | White Beauty........ | 312 | 24 | 300 | .. | 260 | 20 | 332 | .. | 173 | 4 | 255 | 34 |
| 17 | American Giant ..... | 312 | 24 | ..... | .... | ......... | | 352 | .. | 202 | 56 | 289 | 6 |
| 18 | Maggie Murphy...... | 312 | 10 | 224 | 30 | 253 | .. | 160 | .. | 178 | 56 | 225 | 43 |
| 19 | Early Six-weeks...... | 310 | 48 | 147 | 30 | 333 | 40 | 148 | .. | 156 | 56 | 219 | 23 |
| 20 | Prize Taker.......... | 297 | 12 | 285 | .. | 210 | 50 | 184 | . | 234 | 40 | 242 | 20 |
| 21 | Daisy............... | 290 | 24 | 192 | 30 | 293 | 20 | 184 | .. | 220 | .. | 236 | 3 |
| 22 | Burpee's Extra Early. | 290 | 24 | 247 | 30 | 322 | 40 | 168 | .. | 139 | 20 | 233 | 35 |
| 23 | Early Puritan........ | 290 | 23 | 189 | 40 | 319 | .. | 196 | .. | 117 | 20 | 222 | 31 |
| 24 | Sharpe's Seedling..... | 283 | 48 | 250 | .. | 363 | .. | 232 | .. | 102 | 40 | 246 | 18 |
| 25 | Polaris............... | 281 | 36 | 300 | .. | 374 | .. | 224 | .. | 99 | 44 | 255 | 52 |

UNIFORM TEST PLOTS OF POTATOES—*Concluded.*

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | |
| | | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs |
| 26 | Pride of the Market .. | 279 | 24 | 275 | .. | 330 | .. | 160 | .. | 177 | 28 | 244 | 22 |
| 27 | Pearce's Extra Early.. | 279 | 24 | 181 | .. | 403 | 20 | 253 | .. | .......... | | 279 | 11 |
| 28 | Lee's Favourite...... | 275 | .. | 280 | .. | 363 | .. | 176 | .. | 176 | .. | 254 | .. |
| 29 | Delaware.. .......... | 275 | .. | 300 | .. | .......... | | ........ | | 324 | 8 | 299 | 42 |
| 30 | Troy Seedling ........ | 267 | 42 | 282 | 30 | 311 | 40 | 148 | .. | 271 | 10 | 256 | 12 |
| 31 | Holborn Abundance.. | 264 | .. | 350 | .. | 245 | 40 | 192 | .. | 140 | 48 | 238 | 29 |
| 32 | Pride of the Table.... | 261 | 48 | 302 | 30 | 322 | 40 | 124 | .. | 133 | 28 | 228 | 53 |
| 33 | State of Maine .... . | 259 | 36 | 300 | .. | 293 | 20 | 264 | .. | 208 | 16 | 265 | 2 |
| 34 | Seedling No. 214...... | 259 | 36 | .......... | | .......... | | 172 | .. | 95 | 20 | 175 | 39 |
| 35 | Great Divide......... | 258 | 38 | 225 | .. | 319 | .. | 108 | .. | 140 | 48 | 210 | 17 |
| 36 | Money Maker......... | 256 | 22 | 260 | .. | 300 | 40 | 148 | .. | 220 | .. | 237 | .. |
| 37 | Chicago Market...... | 255 | 12 | 300 | .. | 366 | 40 | 220 | .. | 283 | 4 | 284 | 59 |
| 38 | Crown Jewel......... | 250 | 48 | 272 | 30 | 355 | 40 | 220 | .. | 132 | .. | 246 | 12 |
| 39 | Ideal................ | 249 | 33 | .......... | | 315 | 20 | 188 | .. | 117 | 20 | 217 | 33 |
| 40 | Early Ohio........ .. | 244 | 12 | 280 | .. | 308 | 40 | 196 | .. | 225 | 52 | 250 | 57 |
| 41 | Algoma No. 1........ | 244 | 12 | 220 | .. | 271 | 20 | 212 | .. | ......... | | 236 | 52 |
| 42 | Early Sunrise......... | 239 | 48 | 230 | .. | 263 | .. | 196 | .. | 139 | 20 | 213 | 30 |
| 43 | Lizzie's Pride......... | 239 | 48 | 202 | 30 | 278 | 40 | 324 | .. | 168 | 40 | 242 | 43 |
| 44 | Harbinger............ | 233 | 12 | 260 | .. | 253 | .. | 140 | .. | 173 | 4 | 211 | 51 |
| 45 | London ............ | 231 | .. | 235 | .. | 289 | 40 | 304 | .. | 189 | 12 | 249 | 46 |
| 46 | Freeman............... | 231 | .. | 200 | 50 | 304 | 20 | 176 | .. | 149 | 36 | 212 | 21 |
| 47 | Rural Blush...... . .. | 229 | 54 | 178 | 30 | 249 | 20 | 216 | .. | 239 | 4 | 222 | 34 |
| 48 | Brownell's Winner.... | 226 | 52 | 320 | .. | 223 | 40 | 152 | .. | ......... | | 226 | 53 |
| 49 | Dreer's Standard ..... | 226 | 36 | 340 | .. | 352 | .. | 184 | .. | 102 | 40 | 241 | 3 |
| 50 | Dakota Red.......... | 220 | .. | 295 | .. | 289 | 40 | 224 | .. | 293 | 42 | 264 | 28 |
| 51 | Wonder of the World. | .......... | | .......... | | 276 | 40 | 164 | .. | 52 | 48 | 164 | 29 |
| 52 | Carman No. 1........ | 220 | 4 | 345 | .. | 374 | .. | 228 | .. | 293 | 20 | 292 | 5 |
| 53 | Northern Spy ........ | 217 | 48 | 267 | 30 | 326 | 20 | 216 | .. | 152 | 32 | 236 | 2 |
| 54 | Beauty of Hebron .... | 209 | .. | 267 | 30 | 271 | 20 | 208 | .. | 294 | 52 | 250 | 8 |
| 55 | Vanier.... ........ | 209 | .. | .......... | | 280 | .. | 280 | .. | 246 | 24 | 253 | 51 |
| 56 | Early Gem.......... | 199 | 6 | 260 | .. | .......... | | 284 | .. | 190 | 40 | 233 | 21 |
| 57 | Peerless junior....... | 196 | 2 | 320 | .. | 190 | 40 | 136 | .. | 198 | 8 | 208 | 10 |
| 58 | Victor Rose......... | 195 | 7 | 250 | .. | 176 | .. | 200 | .. | .......... | | 205 | 17 |
| 59 | Clay Rose........... | 195 | 7 | 360 | .. | 205 | 20 | 140 | .. | 264 | .. | 232 | 53 |
| 60 | Orphans.............. | 177 | 39 | ........ | | 113 | 40 | 148 | .. | 234 | 40 | 168 | 30 |
| 61 | Pearce's Prize Winner | 138 | 36 | 375 | .. | 381 | 20 | 260 | .. | 158 | 24 | 262 | 40 |
| 62 | Stourbridge Glory.... | 133 | 51 | ......... | | 172 | 20 | 164 | .. | 167 | 32 | 159 | 26 |

NOTE.—Where records of the yield of varieties are omitted, it is in most instances, due to the seed not being received in time for planting.

The twelve varieties of potatoes which have produced the largest crops at the several experimental farms, are the following:—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Wonder ............ | 385 | .. | 7. Late Puritan ............... | 355 | 44 |
| 2. Rochester Rose............... | 381 | 8 | 8. Early Harvest........ ..... | 353 | 55 |
| 3. Early Norther...... ......... | 378 | 24 | 9. Thorburn.......... . ...... | 352 | .. |
| 4. Irish Daisy..... ........... | 366 | 37 | 10. I. X. L...................... | 347 | 36 |
| 5. Early White Prize............ | 363 | .. | 11. Empire State.............. | 347 | 36 |
| 6. New Queen.......... ........ | 363 | .. | 12. Clarke's No. 1 ............ | 341 | .. |

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pearce's Prize Winner | 375 | .. | 7. Dreer's Standard | 340 | .. |
| 2. Clay Rose | 360 | .. | 8. Clarke's No. 1 | 336 | 15 |
| 3. Holborn Abundance | 350 | .. | 9. Rochester Rose | 330 | .. |
| 4. Carman No. 1 | 345 | .. | 10. Early Harvest | 325 | .. |
| 5. Empire State | 340 | .. | 11. Irish Daisy | 325 | .. |
| 6. American Wonder | 340 | .. | 12. Brownell's Winner | 320 | .. |

### Experimental Farm for Manitoba, Brandon, Man.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pearce's Extra Early | 403 | 20 | 7. Sharpe's Seedling | 363 | .. |
| 2. Early Norther | 392 | 20 | 8. Lee's Favourite | 363 | .. |
| 3. Pearce's Prize Winner | 381 | 20 | 9. Early Harvest | 359 | 20 |
| 4. Polaris | 374 | .. | 10. Crown Jewel | 355 | 40 |
| 5. Carman No. 1 | 374 | .. | 11. Dreer's Standard | 352 | .. |
| 6. Thorburn | 363 | .. | 12. Early Rose | 352 | .. |

### Experimental Farm for the North-west Territories, Indian Head, N. W. T.

| | Per acre. Bush. | | Per acre. Bush. |
|---|---|---|---|
| 1. American Giant | 352 | 7. Early Gem | 284 |
| 2. White Beauty | 332 | 8. Vanier | 280 |
| 3. Lizzie's Pride | 324 | 9. Early White Prize | 280 |
| 4. London | 304 | 10. Rochester Rose | 272 |
| 5. Early Harvest | 296 | 11. State of Maine | 264 |
| 6. Late Puritan | 288 | 12. Everett | 264 |

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Delaware | 324 | 8 | 7. Troy Seedling | 271 | 10 |
| 2. Beauty of Hebron | 294 | 52 | 8. Clay Rose | 264 | .. |
| 3. Dakota Red | 293 | 42 | 9. Vanier | 246 | 24 |
| 4. Carman No. 1 | 293 | 20 | 10. Early White Prize | 244 | 34 |
| 5. Chicago Market | 283 | 4 | 11. Rural Blush | 239 | 4 |
| 6. Late Puritan | 281 | 36 | 12. Prize Taker | 234 | 40 |

The twelve varieties of potatoes which have produced the largest crops taking the average of the results obtained at all the experimental farms, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Late Puritan | 313 | 36 | 7. American Giant | 289 | 6 |
| 2. Early Harvest | 303 | 31 | 8. Rochester Rose | 285 | 57 |
| 3. Delaware | 299 | 42 | 9. Chicago Market | 284 | 59 |
| 4. Early White Prize | 293 | 45 | 10. Early Norther | 279 | 48 |
| 5. Empire State | 293 | 27 | 11. Pearce's Extra Early | 279 | 11 |
| 6. Carman No. 1 | 292 | 5 | 12. Irish Daisy | 267 | 43 |

### Conclusions.

It has been clearly shown in the foregoing pages that there are wide variations in the volume of crop produced by different varieties of the same grain or other agricultural product even when grown side by side on similar soil and with similar treatment in every particular. This teaches the great importance of selecting the best varieties of seed for sowing such as have been shown to possess abundant vigour and great fertility, in order that the best results may be obtained.

The variations manifest in the weight of crops produced on the uniform test plots on all the experimental farms are very great. The largest and the smallest crops obtained at the Central Experimental Farm in 1895, and the differences between these are as follows:—

| — | Largest Crop per Acre. | Smallest Crop per Acre. | Difference in Yield per Acre. |
|---|---|---|---|
| | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. |
| Oats | 74·4 | 16·16 | 57·22 |
| Barley, two-rowed | 43·16 | 20·8 | 23·8 |
| do six-rowed | 58·6 | 32·14 | 25·26 |
| Spring wheat | 30·40 | 13·40 | 17·0 |
| Pease | 40·10 | 30·20 | 9·50 |
| Potatoes | 385·0 | 133·51 | 251·9 |
| | Tons. | Tons. | Tons. |
| Indian Corn (cut green for silo) | 37·470 | 13·1280 | 23·1190 |
| Turnips | 13·400 | 6·408 | 7·888 |
| Mangels | 37·976 | 22·682 | 15·294 |
| Carrots | 29·1400 | 11·1100 | 18·300 |

While there are probably other influences which we are unable to detect or estimate which may account for some part of these differences in productiveness, there seems every reason to believe that the larger part can only be accounted for by an inherent difference in vigour and fertility in the varieties. There is no doubt that were the less productive sorts in cultivation replaced by the more prolific varieties and these grown under reasonably good conditions, that the change would bring an enormous gain to the farmers of this country. Some indication of the possibilities in this direction may be given by showing what gain would arise from a small increase per acre from the area under crop of each of the agricultural products referred to, in the single province of Ontario, taking the acreage as given in bulletin 66, 15th November, 1895, of the Ontario Bureau of Industries.

| — | Area under Crop in Ontario, 1895. | Estimated value per bushel. | Value of each Bushel per Acre of Increase for Ontario only. |
|---|---|---|---|
| | Acres. | cts. | $ cts. |
| Oats | 2,373,309 | 30 | 711,992 70 |
| Barley | 478,046 | 35 | 167,316 10 |
| Spring wheat | 223,957 | 75 | 167,967 75 |
| Pease | 799,963 | 55 | 439,979 65 |
| Potatoes | 184,647 | 20 | 36,929 40 |
| | | Per Ton. | Each Ton. |
| | | $ cts. | |
| Indian Corn (cut green for silo) | 148,899 | 1 50 | 223,348 50 |
| Turnips | 151,806 | 3 00 | 455,418 00 |
| Mangels | 34,383 | 3 00 | 103,149 00 |
| Carrots | 13,002 | 3 00 | 39,006 00 |

That much attention is now being given to this important subject is shown by the large and increasing demand for improved varieties of seed. The free distribution of improved sorts for test which has been carried on by the experimental farms during the past seven years has placed, in response to requests, 125,000 three-pound samples in the hands of about 70,000 farmers, and the results obtained from these samples have done much to awaken a general interest in the subject, but the possibilities indicated by the facts and figures submitted in this bulletin call for greater and more general effort so that Canadian farmers everywhere may the sooner reap the reward of increased crops and more remunerative employment offered by this line of improvement. Any increased productiveness obtained by the use of better seed would be nearly clear gain. It would add nothing to the cost of preparing the land or of seeding and but very little to that of harvesting or threshing.

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

BULLETIN No. 25.

# FLAX.

MAY, 1896.

PUBLISHED BY DIRECTION OF THE HON. W. H. MONTAGUE, MINISTER OF AGRICULTURE.

To the Honourable

The Minister of Agriculture.

Sir,—I have the honour to submit for your approval Bulletin No. 25 of the Experimental Farm series, prepared by myself. In this bulletin is discussed the cultivation of flax, both for seed and fibre, and information given as to the preparation of the land and general treatment of this crop.

In view of the present low prices prevailing for the more important cereals, it seems desirable that the farmers of Canada should be placed in possession of all the facts obtainable regarding the smaller branches of the great agricultural industry, so that they may be the better able to avail themselves of such opportunities as may arise of adding to the profits of their work by devoting such portions of their land to these less important crops as may seem judicious and likely to give good returns.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,

*Director Experimental Farms.*

Ottawa, 1st May, 1896.

# FLAX.

By Wm. Saunders, L.L.D., F.R.S.C., F.L.S., &c.

*Director Experimental Farms.*

The cultivation of flax is now receiving greater attention in Canada than formerly, and the area of land devoted to this crop, especially in the province of Manitoba, has of late been largely increased. This is owing partly to the continued low prices obtainable for grain and partly to the unusually high price which flax seed brought during the autumn of 1894.

The flax plant received from the great botanist Linnæus the name of *Linum usitatissimum.* From the generic word *Linum* the words linen, lint and linseed are derived, and the specific name *usitatissimum* which means "most useful," was given to this plant in consideration of the service it has rendered the human family in supplying material for clothing. The fact that the Egyptian mummies were wrapped in linen shows that the use of flax fibre is very ancient.

Fig. 1.

Flax is an annual plant which grows from $1\frac{1}{2}$ to 2 feet and sometimes to 3 feet in height. The stem branches more or less, depending much on the thickness with which the seed is sown and the relative closeness of the plants. The flower, which is shown in figure 1, of the natural size, is of a purplish blue colour, and when fully expanded measures nearly an inch in diameter. The seed pods or "bolls" have ten cells or divisions, each of which contains a single seed. The seeds are brown with a smooth and polished surface, and have a mucilaginous coating which dissolves readily in hot water. When the seed is steeped in this fluid a beverage is made known as "flax seed tea," which is used as a soothing drink in some forms of inflammatory disease. The seed is said to contain about 15 per cent of mucilage, it also yields a large proportion of oil from 22 to 27 per cent, which is known in commerce as linseed oil. To obtain the oil the seed is ground and heated by steam, and while hot is subjected to strong hydraulic pressure when the oil flows freely from the pressed material; the cake left after the oil is extracted is known as oil cake, and is much used as food for cattle.

The fibre is that which gives to flax its greatest value. On cutting through a stem of this plant the centre is found to be occupied by pith, surrounding which is a layer of ordinary woody fibres, and outside of these the inner bark which is formed of very long and remarkably tough fibres; the whole being covered by a skin or epidermis. The object of the processes of retting and scutching of the flax plant is to separate these fibres composing the inner bark from all the other portions. The fibre of flax is very tough and is well adapted for spinning, and as compared with cotton, wool or silk, it is a good conductor of heat, linen clothing being proverbially cool.

## THE FLAX CROP IN MANITOBA.

In Manitoba flax is grown for its seed only; no use has yet been made of the straw, and it is claimed by practical men that the fibre in it is too short, and is too limited in quantity and poor quality to be worked with profit. The area under flax in this province in 1894 is given as 30,000 acres, and the yield averaged 12 bushels per acre, a total of 360,000 bushels. In 1895 the area under flax was 82,500 acres, and the average yield, according to the estimate of the Manitoba Department of Agriculture, was 15½ bushels per acre, giving a total production in that province of 1,281,354 bushels.

## ITS PRODUCTION AND VALUE IN THE UNITED STATES.

The crop of flax seed in the United States in 1894 was a poor one, amounting in all to only about 7,500,000 bushels; whereas the average crop is about 14,000,000 bushels. This shortage resulted in high prices and flax seed in Chicago, one of the chief markets for this product, commanded during the autumn of that year from $1.40 to $1.50 per bushel. The duty on flax seed entering the United States is 20 cents per bushel, and a considerable quantity of the Manitoba crop was bought by United States purchasers, who paid from $1.15 to $1.25 per bushel for it. As the quantity of flax seed grown in North America was not sufficient to supply the demand, the home product was supplemented by large importations from India and the Argentine Republic. The flax crop of 1895 in the United States was a very large one, the area under cultivation was much increased, and the total yield of seed is estimated at nearly 19,000,000 bushels. This abundant crop has brought down the price, which has ranged of late in the principal markets of the United States at from 90 cents to $1 per bushel; and the value in Manitoba on the basis of these prices has fallen to about 70 cents. The flax crop of the United States is produced almost entirely in the North-western States, the greater part of it in Minnesota, North and South Dakota, Iowa, Kansas and Nebraska. As in Manitoba, this crop is grown in the Western States almost entirely for the seed; the efforts which have been repeatedly made to utilize the fibre have not met with much success. It is said that here also the dry climate reduces the quantity of fibre in the straw as well as its quality, so that it does not pay to work it. A small proportion of the straw is used in factories where upholsterers' tow is produced, and also in paper mills, at prices ranging from $2.50 to $4 per ton; but by far the larger part is disposed of by burning.

FLAX GROWING IN THE NORTH-WEST FOR SEED.

Fig. 2.

Flax can be grown on the prairie soils of the North-west on first breaking, but usually produces a heavier crop on back-setting or on a clean fallow. To make this clear to those who are unacquainted with the methods of prairie farming, it may be said that the first breaking on prairie sod is made by turning over a wide and shallow furrow about two inches thick. When this is done in the spring, the land is ready for back-setting in the autumn, by which is meant a second ploughing running across the breaking to a depth of about four inches. This cuts the decayed sod, turns it over and covers it with about two inches of fresh soil from below. Back-setting is the usual preparation for a wheat crop. Where flax is sown on first breaking, a seed bed comparatively free from weeds is provided, the farmer derives a revenue from his land the first year, and the crop effectually rots the sod so as to admit of ploughing to the ordinary depth in the autumn.

QUANTITY OF SEED PER ACRE.

When flax is grown for its seed only, it is usual to sow from two to three pecks per acre, and when thus thinly sown the plants are much branched, as shown in figure 2, and are said to average a larger yield of seed. This, however, seems to require further investigation and the character of the season may influence the results very much. From tests made on the Experimental Farm at Brandon, Man., in 1894, it would appear that heavier seeding may be desirable even when flax is grown for the seed only. These experiments were made on plots of one-tenth of an acre each on land which had been summer fallowed, with the following results:—

Sown 16th May, 40 lbs. seed per acre, ripe 16th August, yield per acre, 19 bush. 26 lbs.

Sown 16th May, 70 lbs. seed per acre, ripe 16th August, yield per acre, 20 bushels.

Sown 16th May, 90 lbs. seed per acre, ripe 16th August, yield per acre, 20 bush. 50 lbs.

In these experiments the flax was sown with the grain drill, cut with a binder and threshed with the separator, care being taken to feed slowly.

### TIME TO SOW.

Experiments were also conducted at Brandon, in 1894, in sowing at different dates, with the following results :—

Sown 11th May, 90 lbs. seed per acre, ripe 13th August, yield per acre, 18 bush. 12 lbs.

Sown 19th May, 90 lbs. seed per acre, ripe 16th August, yield per acre, 20 bush. 50 lbs.

Sown 22nd May, 90 lbs. seed per acre, ripe 22nd August, yield per acre, 21 bush. 14 lbs.

These experiments will need to be repeated for several years before any general conclusions can be drawn from them. At the Experimental Farm at Indian Head, in 1890, the heaviest crop of flax seed was produced when sown on the 17th May; while in 1891 good results were had from seed sown on the 3rd of June. From the experience thus far gained, it would appear that the best time for sowing flax throughout the Canadian North-west would be from the 15th to 25th of May. The flax plant is tender in the spring and easily injured by frost. It is less liable to injury from this cause in the autumn; but if exposed to much frost before the seed is ripe, the seeds become dark and discoloured and are then very much reduced in value.

### FLAX GROWING IN ONTARIO CHIEFLY FOR FIBRE.

The cultivation of flax in Western Ontario has long been carried on mainly for its fibre, the yield of seed being a secondary consideration. The total area under cultivation is said to be from 12,000 to 15,000 acres, and the production of seed in this province for the year 1895 is variously estimated at from 95,000 to 120,000 bushels. The flax industry in Ontario has been stimulated and largely sustained through the operations of the enterprising firm of J. & J. Livingston, of Baden, Ont., who began the working up of flax products in 1864. This firm now operates large oil mills with double sets of presses for the manufacture of linseed oil, and twelve scutching mills for the manufacture of flax fibre, located in different parts of the western portion of the province. The oil mills are run night and day, from Monday morning to Saturday night, for the greater part of the year, and the consumption of seed is from 450,000 to 500,000 bushels annually. The quantity of oil produced varies from 15,000 to 20,000 barrels yearly, all of which finds a market in the Dominion. In ordinary seasons the greater part of the seed required is brought from Manitoba; but in 1894, when seed was scarce and dear, this firm imported 1,000 tons from the Argentine Republic, in order to keep their works partially going. This is the only linseed oil mill in operation in Ontario.

Fig. 3.

To grow flax successfully for fibre, a moist climate is said to be necessary. In a season when the rainfall is deficient, as it was in some sections of Ontario during 1895, the fibre produced is smaller in quantity and is inferior in quality. There are from 40 to 45 scutching mills in Western Ontario where flax fibre is produced, and each mill will work up from 300 to 600 acres of flax, which usually produces an average of 3,000 to 3,500 lbs. of straw per acre. The quantity of seed sown in Ontario is about 80 lbs. per acre, which is said to be sufficient to cover the ground well and produce a thick growth, giving a long and straight straw which yields a fibre of good quality. Fig. 3 represents a plant of a crop thus grown, mainly for fibre. The seed is sown from the middle of April to the middle of May, commonly by a broadcast machine, but sometimes by hand, and the seed is covered by a light harrowing. Where flax is grown for its fibre it is always pulled in harvesting. There are two methods followed in the raising of this crop. In one the proprietors of the mills rent the land on which flax is to be grown at from $8 to $10 per acre. The farmer in this arrangement prepares the ground by ploughing and harrowing, and the owner of the mills grows and harvests the crop. In the other case, the farmer grows and harvests the crop and sells it to the proprietors of the mills usually at $10 per ton for the dried crop, selling the seed with the straw. When the season is favourable and the land in good condition for this crop, it is not uncommon for the farmer to grow from two to three tons per acre. In some localities men are employed in pulling; in others the larger part of this work is done by women and children. The cost of pulling is usually from $4.50 to $5 per acre. A man who is a good puller can make from $1.25 to $1.50 per day at this work. The women earn from 75 cents to $1 per day, and children from 10 to 15 years of age from 30 to 75 cents per day. The crop as pulled is tied in bundles or small sheaves, which are placed for a time in stooks in the field and when dry it is drawn to the storehouses. It is threshed by the use of a special machine which separates the seed without injuring the fibre in the straw, and the straw is subsequently retted and scutched and the fibre thus prepared for the market. The average yield of seed in Ontario during the past year is said to have been from eight to nine bushels per acre, and the weight of straw has averaged about 1½ tons. The fibre manufactured in Canada finds a ready market in the United States and in England.

### FLAX CULTURE IN OTHER PROVINCES.

Flax is grown successfully over the larger part of the settled portions of Quebec, where it is cultivated, in comparatively small areas, chiefly for its fibre, for household purposes. It is retted, scutched, spun, and made into fabrics for household use by the thrifty wives and daughters of French Canadian farmers. Flax is also grown successfully in the Maritime Provinces and in British Columbia.

### OIL MILLS IN OTHER PROVINCES.

There is a linseed oil mill in Winnipeg that has been in operation for several years, which has a capacity for manufacturing from 80 to 90 barrels per week, using 2,000 bushels of seed. This oil, which is made entirely from Manitoba seed, usually supplies the home demand; and when seed is plentiful and there is more made than is required in the province the surplus is sent to the other provinces of the Dominion. A new mill is also in process of erection at Mission, in British Columbia, where, it is proposed, to supplement such seed as can be grown in that province by importations from Manitoba and South America. There is also an oil mill near the city of Quebec, which was in operation in 1893, but has not been working of late.

### IS FLAX A SPECIALLY EXHAUSTING CROP?

This question is usually answered in the affirmative, but this opinion does not appear to be warranted by the chemical analyses which have been made of this crop, showing the principal elements of fertility taken from the soil during the period of its growth. The results which have been obtained by chemical examination may be summarized as follows:—

An acre of flax producing 15 bushels of seed and 2,000 lbs. of straw, takes from the soil—

| —— | Nitrogen in lbs. | Phosphoric Acid in lbs. | Potash in lbs. |
|---|---|---|---|
| For the seed, 840 lbs. | 26· | 14·86 | 9·28 |
| " straw, 2,000 lbs. | 20· | 9· | 28· |
| Total | 46· | 23·86 | 37·28 |

If we compare this with a crop of wheat yielding 25 bushels of grain per acre and 2,200 lbs. of straw, we find that the wheat takes from the soil—

| —— | Nitrogen in lbs. | Phosphoric Acid in lbs. | Potash in lbs. |
|---|---|---|---|
| For the grain, 1,500 lbs. | 28·50 | 12·68 | 8.54 |
| " straw, 2,200 lbs. | 12·03 | 4·96 | 10·57 |
| Total | 40·53 | 17·64 | 19·11 |

If we compare the figures given with those from a crop of oats of 50 bushels to the acre with 2,200 lbs. of straw, we find that there is taken from the soil by the oat crop :—

| —— | Nitrogen in lbs. | Phosphoric in lbs. | Potash in lbs. |
|---|---|---|---|
| For the grain, 1,700 lbs. | 32·13 | 10·48 | 8·05 |
| " straw, 2,200 lbs. | 13·90 | 4·74 | 24·83 |
| Total | 46·03 | 15·22 | 32·88 |

The greater part of the straw of all these crops grown in the North-west is usually burnt, when the mineral ingredients taken from the land are returned to it in the form of ashes. In the east, where the straw is utilized chiefly for bedding animals, the mineral constituents taken up are returned to the soil with the manure, hence the seed only need be considered. It will be seen that the grain, in the case of the wheat crop, takes up a little more nitrogen and somewhat less of phosphoric acid and potash than is taken by the flax seed; while the oat crop takes for the grain a larger proportion of nitrogen, nearly one-third less of phosphoric acid and about one-eighth less of potash. The difference, however, in exhaustive effect of these several crops on a rich soil would scarcely be perceptible, and would not justify the opinion that flax is a very exhausting crop. In some experiments tried at the Experimental Farm at Brandon, Man., during the past year, in sowing wheat, oats and barley after flax, the results obtained point to the same conclusion.

### GENERAL CONSIDERATIONS.

In the growing of flax, one of the first requisites to success is to have the land as free as possible from weeds. In the selecting of the seed for sowing also see that it is free from weed seeds, and the heaviest, brightest and plumpest samples of seed should be preferred. As flax grown for fibre undergoes more or less deterioration each year, the proprietors of flax mills usually import some fresh seed every season from Belgium, Holland or Russia for distribution among their patrons. It is said that the seed is at its best the second year from importation.

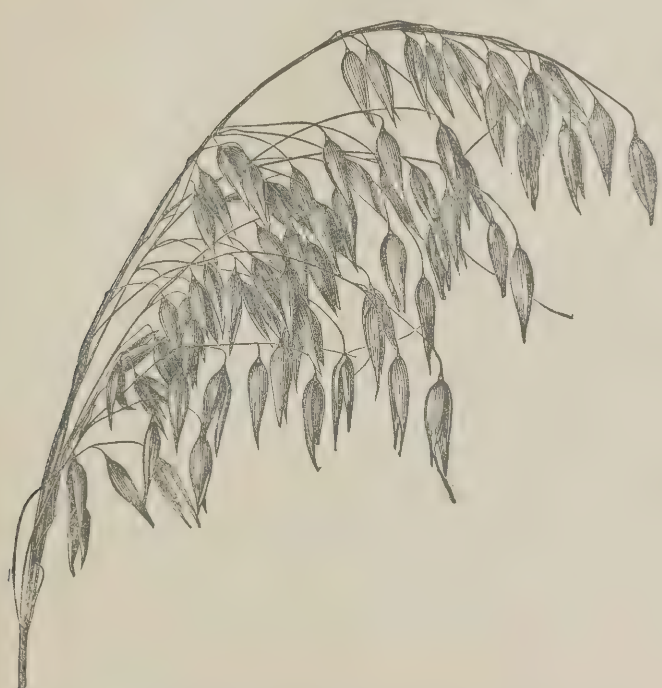
In those parts of Europe where the production of fibre is the prime object, 1½ to 2 bushels of seed, and sometimes more, is sown per acre. In Belgium, where some of the finest quality of fibre is produced, flax is said to succeed best in deep and well cultivated soils that are not heavy. In a dry, calcareous soil the plant grows short; while in a heavy clay soil, although the growth is long, it is said that the fibre is not so valuable. In Ireland any good fertile soil which has been well prepared by thorough cultivation, and is rich enough to produce good crops of cereals is held to be suitable for flax.

In the north-western parts of America, it is common to grow flax after wheat or oats; but no regular system of rotation is followed. In Europe where the soil is not so fertile and new, a systematic rotation is practised with heavy manuring. It is not often that the flax crop is allowed to recur on the same ground oftener than once in five years, and in some districts not oftener than once in seven or eight years. A common rotation is said to be: oats, rye, wheat, clover and flax. Clover is regarded as one of the best crops to precede flax, as its roots penetrate deep into the soil, and bring up stores of fertility from below which most other plants do not reach. Clovers also assimilate and store up nitrogen from the air, and when turned under, furnish much plant food

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA



RESULTS OBTAINED IN 1896 FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN AND ROOTS

## BULLETIN No. 26

JANUARY, 1897

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE.

To the Honourable
The Minister of Agriculture

SIR,—I have the honour to submit for your approval bulletin 26 of the Experimental Farm series, prepared by myself. In this bulletin will be found the results of a large number of experiments which have been carried on at all the experimental farms during the season of 1896, with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots and potatoes, in uniform plots. This work has been undertaken with the object of gaining information as to the relative productiveness and earliness of the many varieties under test. The results show wide variations in the weight of the crops grown and point to the importance of greater care being exercised by farmers in choosing varieties of seed for sowing.

I trust that the information given, covering the experience gained under most of the more important climatic variations found in the Dominion, will be useful to farmers everywhere throughout Canada.

I have the honour to be,
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, 4th January, 1897.

View of the plots of grain at Central Experimental Farm, Ottawa.

# RESULTS OBTAINED IN 1896

FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN AND ROOTS


By William Saunders, LL.D., F.R.S.C., F.L.S., &c.

*Director Experimental Farms.*


In March, 1896, Bulletin 24 of the Experimental Farm series was published, dealing with the results obtained in 1895 from a large number of test plots similar to those now reported on, at each of the experimental farms with many varieties of oats, barley, wheat, pease, Indian corn, turnips, mangels, carrots and potatoes. In order to place in the hands of the farmers of Canada information which may be valuable for them to study before the planting season approaches, the present bulletin is issued in advance of the Annual Report of the Experimental Farms and will be found to contain, in a form convenient for reference, the experience gained from similar work carried on during the season of 1896.

The experiments referred to have been continued with more or less completeness since 1891 on all the Experimental Farms, where the important crops named have been grown side by side on land of fairly uniform character. In preparing for this work much care has been taken to have the seed of each variety chosen, uniform in quality and true to name. A sufficient quantity has been grown or procured at the Central Experimental Farm, and from thence distributed to the branch farms. Suitable instructions have been given as to the preparation of the land, the time and manner of sowing or planting each variety, the quantity of seed to be used; also that the land selected for this purpose be as uniform as possible, with an available area sufficient to include all the varieties of one sort of grain, so as to admit of the plots being arranged side by side and all sown on the same day.

These experiments were planned for the purpose of ascertaining the relative productiveness of the many varieties in cultivation, of all the more valuable farm crops, when grown under similar conditions; also their periods of ripening in the different climates of Canada.

In the following pages particulars are given of the crops produced at each of the Experimental Farms from all the varieties sown, also the average of the crops obtained at all the farms. The time required for the

maturing of the different sorts is also shown, and the varieties in every case are arranged in the order of their productiveness at the Central Experimental Farm at Ottawa.

At the Central Farm most of the crops have been good during the season of 1896. They have also been exceptionally good at the branch farms at Nappan, N.S., and at Indian Head, in the North-west Territories. At the branch Experimental Farm at Brandon they have been above the average; but at the farm at Agassiz, B.C., the season has been unfavourable and the returns are below the average of past years.

## OATS.

Fifty-eight varieties of oats have been tested during the season of 1896. The size of the plots on which they were grown was one-tenth of an acre each at Brandon, Man., and Indian Head, N.W.T., and one-twentieth of an acre each at Ottawa, Ont., Nappan, N.S., and Agassiz, B.C. The quantity of seed sown of each variety was in the proportion of two bushels per acre, and the dates of sowing were as follows:—Ottawa, 30th April and 1st May; Nappan, 5th May; Brandon, 14th May; Indian Head, 5th May, and at Agassiz on 15th April. The average crop of all the varieties of oats grown on these plots at each of the farms we find to be as follows:—At Ottawa, 62 bush. 17 lbs.; at Nappan, 74 bush. 30 lbs.; at Brandon, 63 bush. 17 lbs.; at Indian Head, 76 bush. 19 lbs., and at Agassiz, 46 bush. 22 lbs. The average return given by the whole of the varieties at all the farms is 64 bush. 28 lbs.

### UNIFORM TEST PLOTS OF OATS.

| Number. | Name of Variety. | Yield of the several Experimental Farms, Season of 1896. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Banner........ | 85 | 10 | 99 | 14 | 100 | .. | 94 | 4 | 54 | 24 | 86 | 24 | 94 | 106 | 104 | 105 | 122 | 106⅕ |
| 2 | Golden Beauty... | 80 | .. | 76 | 16 | 76 | 26 | 89 | 24 | 44 | 9 | 73 | 15 | 93 | 106 | 112 | 106 | 120 | 107⅖ |
| 3 | Americ'n Triumph | 78 | 18 | 84 | 4 | 57 | 32 | 97 | 22 | 48 | 8 | 73 | 10 | 95 | 119 | 113 | 106 | 127 | 112 |
| 4 | Columbus..... | 77 | 2 | 83 | 18 | 60 | 30 | 89 | 26 | 57 | 2 | 73 | 22 | 92 | 106 | 105 | 104 | 118 | 105⅖ |
| 5 | White Russian... | 76 | 6 | 88 | 8 | 70 | 20 | 79 | 4 | 46 | 16 | 72 | 4 | 94 | 106 | 110 | 101 | 181 | 105⅘ |
| 6 | Holstein Prolific. | 76 | 6 | 72 | .. | 82 | 22 | 103 | 28 | 53 | 18 | 77 | 21 | 91 | 109 | 96 | 105 | 120 | 104⅕ |
| 7 | Mennonite ...... | 75 | 30 | 93 | .. | 85 | .. | 89 | 4 | 50 | 25 | 78 | 25 | 92 | 110 | 99 | 106 | 123 | 106 |
| 8 | Golden Giant.... | 74 | 24 | 71 | 6 | 76 | 6 | 75 | 10 | .. | .. | 72 | 16 | 101 | 119 | 119 | 115 | .... | 113½ |
| 9 | Brandon ....... | 73 | 28 | 82 | 12 | 70 | .. | 63 | 28 | 41 | 6 | 66 | 8 | 94 | 110 | 113 | 110 | 128 | 111 |
| 10 | Hazlett's Seizure. | 73 | 18 | 58 | 28 | 62 | 32 | 75 | 20 | 45 | 10 | 63 | 8 | 93 | 109 | 103 | 104 | 120 | 105⅘ |
| 11 | Bavarian ........ | 72 | 22 | 38 | 28 | 73 | 8 | 91 | 16 | 58 | 8 | 66 | 30 | 94 | 106 | 104 | 105 | 120 | 105⅘ |
| 12 | Abundance ...... | 72 | 12 | 70 | 20 | 80 | .. | 89 | 14 | 40 | .. | 70 | 16 | 92 | 109 | 98 | 105 | 112 | 103⅕ |
| 13 | Buckbee's Illinois | 72 | 12 | 95 | 30 | 70 | 20 | 70 | .. | 55 | 30 | 72 | 32 | 94 | 110 | 110 | 113 | 128 | 111 |
| 14 | Giant Cluster.... | 71 | 26 | 74 | 4 | 44 | 24 | .. | .. | 45 | 30 | 59 | 4 | 101 | 119 | 112 | .... | 119 | 112⅗ |
| 15 | Improved Ligowo | 71 | 16 | 84 | 4 | 78 | 18 | 92 | 32 | 50 | 20 | 75 | 18 | 89 | 106 | 104 | 96 | 120 | 103 |
| 16 | Early Archangel. | 71 | 16 | 65 | 30 | 61 | 16 | 85 | 30 | 50 | 20 | 67 | 2 | 89 | 106 | 102 | 101 | 120 | 103⅗ |
| 17 | Doncaster Prize.. | 71 | 6 | 62 | 16 | 37 | 12 | 95 | 10 | 51 | 11 | 63 | 17 | 102 | 106 | 119 | 106 | 120 | 110⅗ |

UNIFORM TEST PLOTS OF OATS—*Continued.*

| Number. | Name of Variety. | Yield of the several Experimental Farms, Season of 1896. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Brandon, Man. Bush. | Brandon, Man. Lbs. | Indian Head, N.W.T. Bush. | Indian Head, N.W.T. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of all Farms. Bush. | Average of all Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Brandon, Man. Days. | Indian Head, N.W.T. Days. | Agassiz, B.C. Days. | Average of all Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Oderbruch | 70 | 20 | 84 | 24 | 57 | 22 | 72 | 22 | 55 | 10 | 68 | 6 | 95 | 108 | 110 | 106 | 123 | 108 3/5 |
| 19 | Russell | 70 | 20 | 89 | 14 | 67 | 22 | 62 | 33 | 41 | 13 | 66 | 13 | 95 | 110 | 110 | 114 | 119 | 109 3/5 |
| 20 | American Beauty | 69 | 14 | 76 | 16 | 78 | 18 | 89 | 24 | 50 | 20 | 72 | 32 | 92 | 108 | 104 | 103 | 127 | 106 4/5 |
| 21 | Rennie's Prize | 68 | 8 | 61 | 26 | 68 | 18 | 66 | 26 | 37 | 7 | 60 | 17 | 89 | 100 | 94 | 97 | 119 | 99 4/5 |
| 22 | Flying Scotchman | 68 | 8 | 66 | 6 | 66 | 26 | 60 | 10 | 42 | 12 | 62 | 26 | 90 | 106 | 96 | 98 | 120 | 102 |
| 23 | Early Gothland | 68 | 8 | 77 | 18 | 56 | 6 | 85 | 10 | 61 | 26 | 69 | 27 | 94 | 109 | 113 | 106 | 119 | 108 1/5 |
| 24 | Cromwell | 68 | 8 | 79 | 14 | 52 | 32 | 61 | 16 | 55 | 10 | 63 | 16 | 94 | 110 | 113 | 115 | 119 | 110 1/5 |
| 25 | White Schonen | 66 | 6 | 97 | 2 | 75 | 20 | 84 | 14 | 55 | 30 | 75 | 28 | 93 | 116 | 110 | 105 | 113 | 105 3/5 |
| 26 | Pense | 65 | 30 | 104 | 24 | 39 | 24 | 71 | 6 | 42 | 32 | 64 | 30 | 96 | 109 | 113 | 115 | 123 | 111 1/5 |
| 27 | Lincoln | 65 | 20 | 79 | 14 | .. | .. | 62 | 2 | 47 | 7 | 63 | 19 | 95 | 106 | .... | 104 | 127 | 108 |
| 28 | Ey Golden Prolific | 64 | 24 | 33 | 18 | 88 | 18 | 95 | 30 | 61 | 20 | 68 | 28 | 96 | 106 | 110 | 105 | 128 | 109 |
| 29 | Wallis | 62 | 32 | 82 | 12 | 72 | 32 | 84 | 14 | 51 | 26 | 70 | 30 | 92 | 106 | 110 | 105 | 118 | 106 1/5 |
| 30 | Welcome | 62 | 12 | 58 | 28 | 62 | 2 | 70 | 10 | 50 | 5 | 60 | 25 | 89 | 109 | 97 | 95 | 115 | 101 |
| 31 | Miller | 62 | 12 | 74 | 4 | 66 | 26 | 59 | 16 | 38 | 26 | 60 | 10 | 96 | 106 | 110 | 111 | 128 | 110 1/5 |
| 32 | Cream Egyptian | 61 | 26 | 69 | 14 | 62 | 2 | 71 | 6 | 44 | 9 | 61 | 25 | 94 | 106 | 97 | 94 | 122 | 102 3/5 |
| 33 | Abyssinia | 61 | 6 | 77 | 2 | 65 | .. | 74 | 24 | 50 | 10 | 65 | 22 | 95 | 106 | 110 | 111 | 122 | 108 4/5 |
| 34 | Master | 61 | 6 | 90 | .. | 73 | 18 | 62 | 2 | 52 | 32 | 67 | 32 | 94 | 110 | 110 | 115 | 120 | 109 4/5 |
| 35 | Joanette | 60 | 30 | 88 | 8 | 54 | 14 | 77 | 32 | 34 | 9 | 63 | 5 | 96 | 110 | 111 | 111 | 119 | 109 2/5 |
| 36 | Early Etampes | 60 | 30 | 84 | 14 | 44 | 14 | 79 | 14 | 54 | 24 | 64 | 26 | 96 | 110 | 119 | 111 | 119 | 111 |
| 37 | Rosedale | 60 | 20 | 82 | 32 | 60 | 30 | 66 | 16 | 42 | 12 | 62 | 22 | 94 | 108 | 110 | 109 | 119 | 108 |
| 38 | Victoria Prize | 60 | .. | 50 | .. | 75 | 20 | 70 | .. | 41 | 8 | 59 | 12 | 88 | 109 | 94 | 94 | 113 | 99 3/5 |
| 39 | Poland | 60 | .. | 60 | 20 | 60 | 30 | 64 | 4 | 37 | 22 | 56 | 22 | 92 | 100 | 101 | 97 | 119 | 101 4/5 |
| 40 | Scotch Hopetown | 60 | .. | 62 | .. | 16 | 26 | 63 | 18 | 40 | .. | 48 | 15 | 105 | 109 | 113 | 112 | 123 | 112 2/5 |
| 41 | Bonanza | 59 | 24 | 81 | 6 | 68 | 8 | 67 | 22 | 51 | 8 | 65 | 20 | 88 | 106 | 96 | 94 | 112 | 99 1/5 |
| 42 | Oxford | 59 | 24 | 88 | 28 | 55 | 20 | 68 | 18 | 40 | 26 | 62 | 23 | 95 | 110 | 111 | 115 | 123 | 110 4/5 |
| 43 | Winter Grey | 59 | 14 | 61 | 26 | 87 | 12 | 64 | 24 | 46 | 30 | 64 | .. | 88 | 108 | 86 | 97 | 106 | 97 |
| 44 | Prize Cluster | 58 | 28 | 50 | .. | 47 | 22 | 67 | 2 | 38 | 24 | 52 | 22 | 101 | 109 | 98 | 97 | 123 | 105 3/5 |
| 45 | King | 58 | 8 | 85 | 10 | 47 | 2 | 77 | 32 | 31 | 26 | 60 | 2 | 99 | 106 | 105 | 113 | 127 | 110 |
| 46 | Medal | 57 | 22 | 83 | 18 | 50 | 10 | 67 | 22 | 41 | 8 | 60 | 2 | 94 | 110 | 119 | 115 | 128 | 113 1/5 |
| 47 | Scottish Chief | 56 | 11 | 55 | 30 | 80 | 30 | 60 | 10 | 44 | 4 | 59 | 17 | 88 | 108 | 107 | 98 | 113 | 102 4/5 |
| 48 | Imported Irish | 56 | 6 | 67 | 22 | 64 | 4 | 57 | 12 | 40 | 10 | 57 | 4 | 88 | 99 | 98 | 97 | 112 | 98 4/5 |
| 49 | White Wonder | 56 | 6 | 47 | 2 | 41 | 26 | 73 | 8 | 38 | 12 | 51 | 10 | 89 | 106 | 86 | 93 | 113 | 97 2/5 |
| 50 | Early Maine | 55 | 10 | 77 | 22 | 49 | 4 | 92 | 12 | 47 | 2 | 64 | 10 | 96 | 110 | 116 | 106 | 123 | 110 1/5 |
| 51 | Siberian | 55 | .. | 49 | 14 | 71 | 6 | 71 | 16 | 39 | 14 | 57 | 10 | 98 | 119 | 119 | 113 | 113 | 112 2/5 |
| 52 | Wide Awake | 54 | 4 | 84 | 24 | 70 | 20 | 90 | .. | 47 | 7 | 69 | 11 | 92 | 106 | 110 | 104 | 112 | 104 4/5 |
| 53 | White Monarch | 52 | 32 | 67 | 22 | 56 | 16 | 92 | 2 | 42 | 32 | 62 | 14 | 102 | 106 | 110 | 106 | 118 | 108 3/5 |
| 54 | Prol Blk Tartarian | 52 | 2 | 72 | 32 | 57 | 32 | 80 | .. | 41 | 13 | 62 | 9 | 97 | 106 | 110 | 111 | 123 | 109 2/5 |
| 55 | Olive | 49 | 14 | 86 | .. | 45 | .. | 81 | 6 | 46 | 16 | 61 | 20 | 98 | 110 | 112 | 112 | 113 | 109 |
| 56 | Coulommiers | 47 | 32 | 83 | 18 | 54 | 14 | 58 | 16 | 44 | 14 | 58 | 5 | 105 | 119 | 120 | 115 | 128 | 117 2/5 |
| 57 | Early Blossom | 45 | 30 | 84 | 24 | 58 | 18 | 70 | 6 | 48 | 3 | 61 | 16 | 96 | 109 | 105 | 113 | 119 | 108 2/5 |
| 58 | Cal. Prolific Black | 45 | 10 | 83 | 18 | 57 | 2 | 84 | 24 | 44 | 24 | 63 | 2 | 96 | 106 | 113 | 111 | 127 | 110 3/5 |

Among the varieties included in the above list there are ten of the cross-bred sorts which have been produced at the experimental farms, they are the following: Brandon, Russell, Cromwell, Pense, Miller, Master, Oxford, King, Medal and Olive. The average crops obtained of these new varieties are, at Ottawa, 62 bush. 24 lbs.; at Nappan, 86 bush. 12 lbs.; at Brandon, 56 bush. 29 lbs.; at Indian Head, 67 bush. 21 lbs.; and at Agassiz, 43 bush. 9 lbs. The average yield, taking the results obtained at all the farms, is 63 bush. 12 lb. per acre.

The Golden Giant was omitted at Agassiz, the Giant Cluster at Indian Head and the Lincoln at Brandon for the reason that the seed was not received in time for sowing.

The twelve varieties of oats which have produced the largest crops during 1896 at the several experimental farms are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 85 | 10 | 7. Mennonite | 75 | 30 |
| 2. Golden Beauty | 80 | .. | 8. Golden Giant | 74 | 24 |
| 3. American Triumph | 78 | 18 | 9. Brandon | 73 | 28 |
| 4. Columbus | 77 | 2 | 10. Hazlett's Seizure | 73 | 18 |
| 5. White Russian | 76 | 6 | 11. Bavarian | 72 | 22 |
| 6. Holstein Prolific | 76 | 6 | 12. Abundance | 72 | 12 |

An average yield of 76 bush. 10 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pense | 104 | 24 | 7. Russell | 89 | 14 |
| 2. Banner | 99 | 14 | 8. Oxford | 88 | 28 |
| 3. White Schonen | 97 | 2 | 9. Joanette | 88 | 8 |
| 4. Buckbee's Illinois | 95 | 30 | 10. White Russian | 88 | 8 |
| 5. Mennonite | 93 | .. | 11. Olive | 86 | .. |
| 6. Master | 90 | .. | 12. King | 85 | 10 |

An average yield of 92 bush. 10 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 100 | .. | 7. Abundance | 80 | .. |
| 2. Early Golden Prolific | 88 | 18 | 8. American Beauty | 78 | 18 |
| 3. Winter Grey | 87 | 12 | 9. Improved Ligowo | 78 | 18 |
| 4. Mennonite | 85 | .. | 10. Golden Beauty | 76 | 26 |
| 5. Holstein Prolific | 82 | 22 | 11. Golden Giant | 76 | 6 |
| 6. Scottish Chief | 80 | 30 | 12. White Schonen | 75 | 20 |

An average yield of 82 bush. 17 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holstein Prolific | 103 | 18 | 7. Early Maine | 92 | 12 |
| 2. American Triumph | 97 | 22 | 8. White Monarch | 92 | 2 |
| 3. Early Golden Prolific | 95 | 30 | 9. Bavarian | 91 | 16 |
| 4. Doncaster Prize | 95 | 10 | 10. Wide Awake | 90 | .. |
| 5. Banner | 94 | 4 | 11. American Beauty | 89 | 24 |
| 6. Improved Ligowo | 92 | 32 | 12. Abundance | 89 | 24 |

An average yield of 93 bush. 24 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Gothland | 61 | 26 | 7. Cromwell | 55 | 10 |
| 2. Early Golden Prolific | 61 | 20 | 8. Oderbruch | 55 | 10 |
| 3. Bavarian | 58 | 8 | 9. Banner | 54 | 24 |
| 4. Columbus | 57 | 2 | 10. Early Etampes | 54 | 24 |
| 5. White Schonen | 55 | 30 | 11. Holstein Prolific | 53 | 18 |
| 6. Buckbee's Illinois | 55 | 30 | 12. Master | 52 | 32 |

An average yield of 56 bush. 14 lbs. per acre.

The twelve varieties which have produced the largest average crops on all the farms, and hence may perhaps be regarded as worthy of being placed at the head of the list for general cultivation are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 86 | 24 | 7. Golden Beauty | 73 | 15 |
| 2. Mennonite | 78 | 25 | 8. American Triumph | 73 | 10 |
| 3. Holstein Prolific | 77 | 21 | 9. American Beauty | 72 | 32 |
| 4. White Schonen | 75 | 28 | 10. Buckbee's Illinois | 72 | 32 |
| 5. Improved Ligowo | 75 | 18 | 11. White Russian | 72 | 4 |
| 6. Columbus | 73 | 22 | 12. Wallis | 70 | 30 |

An average yield of 75 bush. 10 lbs. per acre.

It will be seen that the Banner oat is the only variety which appears among the twelve best sorts at each of the farms, and that it stands at the head of the list of the twelve varieties which have averaged best at all the farms. This prolific oat has also given at Indian Head, during the past season, a crop of 1,958 bush. from twenty acres of land, an average of 97 bush. 21 lbs. per acre. The Holstein Prolific appears among the best twelve sorts at four of the farms, and Abundance, Bavarian, Early Golden Prolific, Mennonite and White Schonen among the best twelve at three of them.

In the list of the twelve sorts which have given the best results throughout the Dominion, there are seven of those which are first in productiveness at Ottawa, five of the best twelve at Nappan, eight of the best twelve at Brandon, five of the best twelve at Indian Head, and five of the best twelve at Agassiz.

## BARLEY.

The trial plots of barley for 1896 have included seventeen different sorts of two-rowed barley and nineteen of six-rowed. The plots were of the same size as those sown with oats. The quantity of seed sown in each case was two bushels per acre, and the following were the dates of seeding:—Ottawa, 5th May; Nappan, 9th May; Brandon, 19th May; Indian Head, 16th May, and Agassiz, 20th April.

UNIFORM TEST PLOTS OF TWO-ROWED BARLEY.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1896. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Bolton ..... .... | 51 | 2 | 27 | 44 | 43 | 16 | 55 | 40 | 27 | 4 | 41 | 2 | 91 | 103 | 87 | 96 | 112 | 97 4/5 |
| 2 | Newton ......... | 51 | 2 | 22 | 4 | 47 | 44 | 68 | 36 | 18 | 16 | 41 | 30 | 94 | 111 | 93 | 98 | 112 | 101 4/5 |
| 3 | Danish Chevalier. | 50 | 10 | 26 | 32 | 41 | 12 | 61 | 22 | 40 | .. | 43 | 44 | 96 | 111 | 99 | 100 | 112 | 103 3/5 |
| 4 | Canadian Thorpe. | 49 | 28 | 17 | 24 | 32 | 34 | 65 | .. | 42 | 24 | 41 | 22 | 94 | 111 | 100 | 102 | 106 | 102 3/5 |
| 5 | Kinver Chevalier. | 49 | 8 | 26 | 12 | 32 | 44 | 42 | 24 | 38 | 28 | 37 | 42 | 95 | 111 | 99 | 101 | 112 | 103 3/5 |
| 6 | Pacer ........... | 48 | 6 | 28 | 16 | 30 | 20 | 46 | 2 | 16 | 32 | 33 | 44 | 91 | 111 | 107 | 102 | 112 | 104 3/5 |
| 7 | Victor........... | 46 | 32 | 26 | 32 | 32 | 24 | 60 | 40 | 24 | 8 | 38 | 8 | 91 | 110 | 92 | 100 | 112 | 101 |
| 8 | Sidney .......... | 46 | 12 | 26 | 32 | 37 | 34 | 61 | 42 | 22 | 4 | 38 | 44 | 90 | 110 | 87 | 100 | 107 | 98 4/5 |
| 9 | French Chevalier | 45 | 43 | 31 | 12 | 41 | 2 | 73 | 16 | 44 | 8 | 47 | 6 | 97 | 111 | 89 | 101 | 112 | 102 |
| 10 | Nepean.......... | 45 | 30 | 42 | 4 | 30 | 10 | 57 | 24 | 15 | 40 | 38 | 12 | 91 | 111 | 99 | 100 | 106 | 101 2/5 |
| 11 | Thanet.......... | 44 | 28 | 32 | 4 | 35 | 30 | 50 | 30 | 25 | 40 | 37 | 36 | 95 | 111 | 99 | 102 | 112 | 103 4/5 |
| 12 | Beaver . . .. . | 44 | 8 | 33 | 16 | 29 | 28 | 66 | 32 | 37 | 4 | 42 | 8 | 94 | 105 | 87 | 98 | 107 | 98 1/5 |
| 13 | Prize Prolific.... | 41 | 42 | 33 | 16 | 36 | 32 | 52 | 4 | 29 | 8 | 38 | 30 | 95 | 111 | 99 | 101 | 113 | 103 4/5 |
| 14 | Duck-bill........ | 39 | 28 | 28 | 36 | .. | .. | 60 | 20 | 28 | 12 | 39 | 12 | 94 | 105 | .... | 100 | 106 | 101 1/5 |
| 15 | California Prolific | 39 | 28 | 31 | 12 | 23 | 46 | 63 | 46 | 25 | 20 | 36 | 40 | 94 | 111 | 101 | 100 | 113 | 103 4/5 |
| 16 | Monck .......... | 36 | 42 | 17 | 10 | 33 | 6 | 57 | 44 | 16 | 12 | 32 | 13 | 95 | 111 | 108 | 103 | 113 | 106 |
| 17 | Rigid........... | 34 | 38 | 19 | 8 | 33 | 6 | 60 | 20 | 20 | .. | 33 | 24 | 95 | 111 | 89 | 84 | 117 | 99 1/5 |

The above list includes eight hybrid sorts which have been produced at the experimental farms; these are Bolton, Pacer, Victor, Sidney, Nepean, Beaver, Monck and Rigid. The average crops obtained from these eight

varieties are: at Ottawa, 44 bush. 9 lbs.; Nappan, 27 bush. 30 lbs.; Brandon, 33 bush. 36 lbs.; Indian Head, 58 bush. 18 lbs., and at Agassiz, 22 bush. 7 lbs. The average crop, taking the results obtained from these hybrids at all the farms, is 37 bush. 12 lbs. per acre.

The plot of Duck-bill barley at Brandon was so badly injured by a wash of water that no estimate of the crop could be given.

The six varieties of two-rowed barley which have produced the largest crops at the several experimental farms during 1896 are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Bolton | 51 | 2 | 4. Canadian Thorpe | 49 | 28 |
| 2. Newton | 51 | 2 | 5. Kinver Chevalier | 49 | 8 |
| 3. Danish Chevalier | 50 | 10 | 6. Pacer | 48 | 6 |

An average yield of 49 bush. 41 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Nepean | 42 | 4 | 4. Thanet | 32 | 4 |
| 2. Beaver | 33 | 16 | 5. French Chevalier | 31 | 12 |
| 3. Prize Prolific | 33 | 16 | 6. California Prolific | 31 | 12 |

An average yield of 33 bush. 42 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Newton | 47 | 44 | 4. French Chevalier | 41 | 2 |
| 2. Bolton | 43 | 16 | 5. Sidney | 37 | 34 |
| 3. Danish Chevalier | 41 | 12 | 6. Prize Prolific | 36 | 32 |

An average yield of 41 bush. 15 lbs. per acre.

EXPERIMENTAL FARM FOR THE N.W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 73 | 16 | 4. Canadian Thorpe | 65 | .. |
| 2. Newton | 68 | 36 | 5. California Prolific | 63 | 46 |
| 3. Beaver | 66 | 32 | 6. Sidney | 61 | 42 |

An average yield of 66 bush. 28 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 44 | 8 | 4. Kinver Chevalier | 38 | 28 |
| 2. Canadian Thorpe | 42 | 24 | 5. Beaver | 37 | 4 |
| 3. Danish Chevalier | 40 | .. | 6. Prize Prolific | 29 | 8 |

An average yield of 38 bush. 28 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest crops, taking the average of the results obtained on all the experimental farms, are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 47 | 6 | 4. Newton | 41 | 30 |
| 2. Danish Chevalier | 43 | 44 | 5. Canadian Thorpe | 41 | 22 |
| 3. Beaver | 42 | 8 | 6. Bolton | 41 | 2 |

An average yield of 42 bush. 42 lbs. per acre.

The average crop of all the varieties of two-rowed barley at each of the experimental farms we find to be as follows: At Ottawa, 45 bushels; Nappan, 28 bush. 12 lbs.; Brandon, 35 bush. 6 lbs.; Indian Head, 59 bush. 6 lbs., and at Agassiz, 27 bush. 35 lbs. The average return given by the whole of the varieties at all the farms is 39 bush. 2 lbs. per acre.

UNIFORM TEST PLOTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1896. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N. W. T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N. W. T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Odessa | 69 | 8 | 22 | 44 | 32 | 24 | 62 | 24 | 25 | .. | 42 | 20 | 86 | 103 | 90 | 87 | 100 | 93 |
| 2 | Royal | 62 | 4 | 29 | 8 | 41 | 42 | 61 | 40 | 25 | 22 | 44 | 4 | 86 | 103 | 90 | 90 | 100 | 94 |
| 3 | Champion | 61 | 12 | 47 | 44 | 52 | 4 | 53 | 16 | 20 | .. | 46 | 44 | 82 | 94 | 90 | 90 | 93 | 90 |
| 4 | Mensury | 61 | 2 | 61 | 32 | 59 | 18 | 71 | 42 | 28 | 16 | 56 | 22 | 87 | 97 | 91 | 90 | 99 | 93 |
| 5 | Baxter's | 60 | .. | 36 | 12 | 36 | 22 | 65 | .. | 28 | 16 | 45 | 10 | 83 | 110 | 90 | 94 | 101 | 96 |
| 6 | Trooper | 58 | 46 | 47 | 44 | 40 | 40 | 67 | 14 | 22 | 24 | 47 | 24 | 85 | 110 | 89 | 94 | 107 | 97 |
| 7 | Summit | 58 | 46 | 42 | 4 | 29 | 38 | 59 | 18 | 24 | 28 | 42 | 46 | 86 | 110 | 90 | 93 | 113 | 98 |
| 8 | Phœnix | 58 | 36 | 26 | 12 | 42 | 14 | 58 | .. | 15 | .. | 40 | 3 | 82 | 97 | 88 | 83 | 95 | 89 |
| 9 | Excelsior | 57 | 24 | 38 | 8 | 43 | 46 | 54 | 18 | 23 | 36 | 43 | 26 | 82 | 94 | 90 | 86 | 107 | 92 |
| 10 | Pioneer | 56 | 32 | 30 | .. | ...... | | 48 | 16 | 26 | 12 | 40 | 15 | 89 | 105 | .. | 96 | 98 | 97 |
| 11 | Stella | 55 | .. | 42 | 4 | 42 | 14 | 55 | 30 | 19 | 28 | 42 | 44 | 83 | 110 | 80 | 90 | 112 | 95 |
| 12 | Common | 54 | 38 | 25 | 40 | 55 | .. | 68 | 36 | 29 | 8 | 46 | 34 | 83 | 110 | 86 | 86 | 107 | 94 |
| 13 | Nugent | 50 | 10 | 47 | 44 | 45 | 20 | 55 | 20 | 19 | 8 | 43 | 30 | 88 | 110 | 90 | 90 | 112 | 98 |
| 14 | Oderbruch | 48 | 26 | 37 | 4 | 34 | 28 | 65 | 10 | 28 | 16 | 42 | 36 | 88 | 97 | 85 | 86 | 107 | 93 |
| 15 | Rennie's Improved | 47 | 4 | 17 | 44 | 39 | 18 | 55 | 20 | 19 | 28 | 35 | 42 | 83 | 97 | 88 | 100 | 100 | 94 |
| 16 | Vanguard | 46 | 32 | 37 | 4 | 40 | 30 | 55 | 10 | 16 | 32 | 39 | 12 | 81 | 97 | 90 | 86 | 93 | 89 |
| 17 | Petschora | 45 | 40 | 17 | 44 | 33 | 26 | 58 | 16 | 17 | 44 | 34 | 34 | 80 | 105 | 90 | 86 | 98 | 92 |
| 18 | Success | 43 | 46 | 44 | 20 | 35 | 30 | 50 | .. | 15 | 20 | 37 | 42 | 80 | 94 | 84 | 79 | 93 | 86 |
| 19 | Surprise | 41 | 2 | 56 | 32 | 38 | 36 | 52 | 12 | 18 | 36 | 41 | 24 | 89 | 110 | 90 | 90 | 112 | 98 |

Among the varieties included in these tests of six-rowed barley are nine of the hybrid sorts, which have been originated at the experimental farms. These are Royal, Trooper, Summit, Phœnix, Pioneer, Stella, Nugent, Vanguard and Surprise. These nine new varieties have given the following average crops: At Ottawa, 54 bush. 12 lbs.; Nappan, 39 bush. 43 lbs.; Brandon, 40 bush. 11 lbs.; Indian Head, 57 bush. 2 lbs., and at Agassiz, 20 bush. 42 lbs. The average results of all the tests of six-rowed barley at all the farms is 42 bush. 22 lbs. per acre.

The Pioneer barley was omitted at Brandon for the reason that the seed was not received in time for sowing.

The six varieties of six-rowed barley which have produced the largest crop at the several experimental farms during 1896 are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 69 | 8 | 4. Mensury | 61 | 2 |
| 2. Royal | 62 | 4 | 5. Baxter's | 60 | .. |
| 3. Champion | 61 | 12 | 6. Trooper | 58 | 46 |

An average yield of 60 bush. 21 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 61 | 32 | 4. Nugent | 47 | 44 |
| 2. Surprise | 56 | 32 | 5. Champion | 47 | 44 |
| 3. Trooper | 47 | 44 | 6. Success | 44 | 20 |

An average yield of 51 bush. 4 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 59 | 18 | 4. Nugent | 45 | 20 |
| 2. Common | 55 | . | 5. Excelsior | 43 | 46 |
| 3. Champion | 52 | 4 | 6. Stella | 42 | 14 |

An average yield of 49 bush. 33 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 71 | 42 | 4. Oderbruch | 65 | 10 |
| 2. Common | 68 | 36 | 5. Baxter's | 65 | .. |
| 3. Trooper | 67 | 14 | 6. Odessa | 62 | 24 |

An average yield of 66 bush. 37 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Common | 29 | 8 | 4. Oderbruch | 28 | 16 |
| 2. Mensury | 28 | 16 | 5. Pioneer | 26 | 12 |
| 3. Baxter's | 28 | 16 | 6. Royal | 25 | 22 |

An average yield of 27 bush. 31 lbs. per acre.

The six varieties of six-rowed barley which have produced the largest crops, taking the average of the results obtained on all the experimental farms and hence may perhaps be regarded as the most promising sorts for general cultivation are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 58 | 22 | 4. Common | 46 | 34 |
| 2. Trooper | 47 | 24 | 5. Baxter's | 45 | 10 |
| 3. Champion | 46 | 44 | 6. Royal | 44 | 4 |

An average yield of 47 bush. 29 lbs. per acre.

The average crop of all the varieties of six-rowed barley tested at each of the experimental farms we find to be as follows :—At Ottawa, 54 bush. 29 lbs. ; Nappan, 37 bush. 15 lbs. ; Brandon, 41 bush. 17 lbs. ; Indian Head, 58 bush. 40 lbs., and at Agassiz, 22 bush. 14 lbs. The average return given by the whole of the varieties at all the farms is 42 bush. 42 lbs. per acre.

## SPRING WHEAT.

Thirty-nine varieties of spring wheat have been under trial during 1896. These were sown in plots of $\frac{1}{10}$th acre each at Brandon and Indian Head and $\frac{1}{20}$th acre each at Ottawa, Nappan and Agassiz. The quantity of seed sown of each sort was in the proportion of one and one-half bushels per acre and the dates of sowing were as follows :—At Ottawa, 30th April;

Nappan, 25th April; Brandon, 8th May; Indian Head, 2nd May, and at Agassiz, 18th April.

UNIFORM TEST PLOTS OF SPRING WHEAT.

| Number. | Name of Variety. | Yield of the several Experimental Farms, Season of 1896. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Hungarian | 24 | 20 | 31 | 40 | 30 | 50 | 38 | 30 | . | .. | 31 | 20 | 96 | 129 | 119 | 116 | .... | 115 |
| 2 | Preston | 24 | .. | 47 | . | .. | .. | 41 | 50 | 29 | 40 | 35 | 37 | 95 | 120 | .... | 110 | 111 | 109 |
| 3 | Stanley | 23 | .. | 49 | .. | 25 | .. | 40 | 30 | 21 | 40 | 31 | 50 | 95 | 120 | 109 | 114 | 109 | 109 2/5 |
| 4 | Alpha | 22 | 50 | 42 | 20 | 24 | 30 | 40 | 50 | 23 | .. | 30 | 42 | 95 | 118 | 112 | 114 | 111 | 110 |
| 5 | White Russian | 22 | 30 | 48 | 20 | 26 | 40 | 40 | 30 | .. | .. | 34 | 30 | 101 | 127 | 119 | 115 | ... | 115½ |
| 6 | Monarch | 22 | 10 | 56 | 40 | 32 | 30 | 41 | 10 | 23 | 40 | 35 | 14 | 100 | 120 | 116 | 118 | 115 | 113 4/5 |
| 7 | Colorado | 22 | .. | 40 | 20 | 27 | 50 | 36 | 50 | .. | .. | 31 | 45 | 96 | 120 | 109 | 114 | .... | 109¾ |
| 8 | Golden Drop | 21 | 40 | 36 | 40 | 18 | 30 | 42 | .. | 18 | 10 | 27 | 24 | 96 | 120 | 109 | 114 | 111 | 110 |
| 9 | Beauty | 21 | 30 | 40 | 40 | 25 | 50 | 39 | 20 | 16 | 40 | 28 | 28 | 99 | 129 | 119 | 114 | 115 | 115 1/5 |
| 10 | Rio Grande | 21 | 20 | 45 | 40 | 38 | 30 | 39 | .. | 16 | 40 | 32 | 14 | 101 | 127 | 109 | 116 | 114 | 113 2/5 |
| 11 | Progress | 21 | 10 | 37 | 22 | 22 | 30 | 43 | 10 | 17 | .. | 28 | 14 | 95 | 129 | 109 | 112 | 115 | 112 |
| 12 | Red Fife | 20 | 40 | 38 | .. | 26 | 40 | 41 | 20 | 23 | 20 | 30 | .. | 100 | 127 | 119 | 116 | 114 | 115 1/5 |
| 13 | Beaudry | 20 | 20 | 37 | 20 | 19 | 20 | 43 | 10 | 19 | 10 | 27 | 52 | 96 | 129 | 108 | 114 | 111 | 111 3/5 |
| 14 | Goose | 19 | 40 | 47 | 40 | 38 | 30 | 45 | 50 | 21 | 20 | 34 | 36 | 102 | 118 | 126 | 116 | 115 | 115 2/5 |
| 15 | Dawn | 19 | 40 | 45 | .. | 24 | 10 | 36 | .. | 30 | .. | 30 | 58 | 91 | 119 | 103 | 108 | 109 | 106 |
| 16 | Crown | 19 | 20 | 44 | 40 | 27 | 40 | 39 | 50 | 23 | 40 | 31 | 2 | 96 | 129 | 109 | 115 | 115 | 112 4/5 |
| 17 | Advance | 19 | 20 | 44 | .. | 28 | 10 | 39 | 26 | 19 | .. | 29 | 59 | 96 | 120 | 109 | ... | 115 | 110 |
| 18 | Vernon | 19 | 10 | 33 | 20 | 25 | 10 | 37 | 30 | 20 | .. | 27 | 2 | 97 | 129 | 108 | 115 | 115 | 112 4/5 |
| 19 | Huron | 19 | .. | 45 | .. | 28 | 10 | 44 | 40 | 18 | 40 | 31 | 6 | 96 | 129 | 109 | 114 | 115 | 112 3/5 |
| 20 | Pringl's Champl'n | 19 | .. | 41 | 40 | 29 | 20 | 42 | 30 | 23 | 20 | 31 | 10 | 100 | 120 | 109 | 116 | 115 | 112 |
| 21 | Black Sea | 17 | 40 | 39 | 40 | 18 | 30 | 38 | 50 | .. | .. | 28 | 40 | 92 | 119 | 104 | 114 | .... | 107¼ |
| 22 | Herisson Bearded | 17 | 30 | 32 | .. | 26 | 30 | 38 | 20 | 29 | 20 | 28 | 44 | 97 | 129 | 108 | 115 | 119 | 113 3/5 |
| 23 | Percy | 17 | 20 | 42 | 20 | 20 | 40 | 40 | 10 | 20 | 20 | 28 | 10 | 96 | 127 | 116 | 114 | 109 | 112 2/5 |
| 24 | Captor | 16 | 40 | 38 | 20 | 25 | .. | 40 | 20 | 19 | 20 | 27 | 56 | 97 | 129 | 109 | 115 | 111 | 112 1/5 |
| 25 | Red Fern | 16 | 40 | 46 | 40 | 24 | 20 | 43 | 30 | 27 | 40 | 31 | 46 | 100 | 120 | 118 | 116 | 111 | 113 |
| 26 | White Connell | 16 | 40 | 44 | .. | 25 | .. | 43 | .. | 28 | 20 | 31 | 24 | 102 | 129 | 116 | 118 | 119 | 116 4/5 |
| 27 | Ladoga | 16 | 20 | 47 | .. | 18 | 50 | 39 | 10 | 23 | 20 | 28 | 56 | 91 | 119 | 109 | 114 | 109 | 108 2/5 |
| 28 | Admiral | 16 | 10 | 31 | 40 | 22 | 30 | 43 | 30 | 22 | .. | 27 | 22 | 97 | 129 | 107 | 115 | 119 | 113 2/5 |
| 29 | Old Red River | 15 | 40 | 45 | 40 | 28 | 10 | 38 | 50 | 27 | 20 | 31 | 8 | 101 | 129 | 118 | 118 | 119 | 117 |
| 30 | Dion's | 15 | .. | 41 | 40 | 24 | .. | 38 | 50 | 19 | 10 | 27 | 44 | 100 | 127 | 119 | 116 | 115 | 115 2/5 |
| 31 | Wellman's Fife | 14 | 50 | 50 | .. | 26 | 10 | 42 | .. | 25 | .. | 31 | 36 | 101 | 127 | 116 | 118 | 119 | 116 1/5 |
| 32 | Emporium | 14 | 40 | 38 | .. | 24 | 30 | 44 | .. | 28 | 20 | 29 | 54 | 100 | 127 | 112 | 118 | 115 | 114 2/5 |
| 33 | Cam. White Chaff | 14 | 40 | 39 | 20 | 23 | 30 | 39 | 10 | 26 | 10 | 28 | 34 | 97 | 127 | 112 | 115 | 115 | 113 1/5 |
| 34 | White Fife | 14 | 20 | 39 | 20 | 29 | 10 | 41 | .. | 19 | 40 | 28 | 42 | 102 | 127 | 119 | 118 | 111 | 115 2/5 |
| 35 | Blenheim | 14 | .. | 42 | 40 | 23 | 40 | 41 | 10 | 22 | 10 | 28 | 44 | 95 | 129 | 109 | 115 | 115 | 112 3/5 |
| 36 | Dufferin | 13 | 30 | 41 | 20 | 24 | 30 | 43 | 30 | 25 | .. | 29 | 34 | 94 | 119 | 109 | 114 | 109 | 109 |
| 37 | Gehun | 9 | .. | 39 | .. | 24 | 10 | 46 | 20 | 18 | 20 | 27 | 22 | 97 | 118 | 109 | 108 | 111 | 108 3/5 |
| 38 | Rideau | .. | .. | 43 | 20 | 21 | 40 | 43 | 10 | 19 | 20 | 31 | 52 | .... | 119 | 109 | 112 | 115 | 113 3/5 |
| 39 | Countess | .. | .. | 34 | 40 | 25 | 20 | 46 | 50 | 24 | .. | 32 | 42 | .... | 129 | 109 | 112 | 111 | 115 1/5 |

Among the varieties included in these tests of spring wheat there are eighteen cross-bred sorts which have been originated at the experimental farms. These are Preston, Stanley, Alpha, Monarch, Beauty, Progress, Dawn, Crown, Advance, Vernon, Huron, Percy, Captor, Admiral, Blenheim, Dufferin, Rideau and Countess. These have given the following average crops: At Ottawa, 19 bush. 18 lbs. per acre; Nappan, 42 bush. 11 lbs.; Brandon, 25 bush. 7 lbs.; Indian Head, 41 bush. 16 lbs., and at Agas-

siz, 21 bush. 57 lbs. per acre. The average yield taking the results obtained from all the farms is 29 bush. 57 lbs. per acre.

Preston, one of the cross-bred sorts between Ladoga and Red Fife which heads the list this year of the twelve best varieties at all the farms occupied the same position last year. This year, however, the record with this variety is not complete for the reason that there is no report from Brandon. As the three heaviest yielding varieties at Brandon have given an average of 36 bush. 30 lbs. per acre, it is highly probable that Preston would have given as good a record had it been sown and for that reason it has been included in this list. There are three other varieties with incomplete records, viz., Countess, 32 bush. 42 lbs.; Rideau, 31 bush. 52 lbs. which were omitted at Ottawa and Colorado, 31 bush. 45 lbs., omitted at Agassiz which would have similar claim to be included in this special list, but for the reason that the best yields of wheat obtained at Ottawa and Agassiz would not have been sufficient if added to the returns from the other four farms to have given these latter varieties that high standing. Besides the omissions referred to, Hungarian, White Russian and Black Sea, were left out of the tests at Agassiz for the reason that the seed was not received in time for sowing.

The twelve varieties of spring wheat which have produced the largest crops at the several experimental farms during 1896 are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Hungarian | 24 | 20 | 7. Colorado | 22 | .. |
| 2. Preston | 24 | .. | 8. Golden Drop | 21 | 40 |
| 3. Stanley | 23 | .. | 9. Beauty | 21 | 30 |
| 4. Alpha | 22 | 50 | 10. Rio Grande | 21 | 20 |
| 5. White Russian | 22 | 30 | 11. Progress | 21 | 10 |
| 6. Monarch | 22 | 10 | 12. Red Fife | 20 | 40 |

An average yield of 22 bush. 16 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Monarch | 56 | 40 | 7. Ladoga | 47 | .. |
| 2. Wellman's Fife | 50 | .. | 8. Red Fern | 46 | 40 |
| 3. Stanley | 49 | .. | 9. Old Red River | 45 | 40 |
| 4. White Russian | 48 | 20 | 10. Rio Grande | 45 | 40 |
| 5. Goose | 47 | 40 | 11. Huron | 45 | .. |
| 6. Preston | 47 | .. | 12. Dawn | 45 | .. |

An average yield of 47 bush. 48 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rio Grande | 38 | 30 | 7. Huron | 28 | 10 |
| 2. Goose | 38 | 30 | 8. Advance | 28 | 10 |
| 3. Monarch | 32 | 30 | 9. Old Red River | 28 | 10 |
| 4. Hungarian | 30 | 50 | 10. Colorado | 27 | 50 |
| 5. Pringle's Champlain | 29 | 20 | 11 Crown | 27 | 40 |
| 6. White Fife | 29 | 10 | 12. Red Fife | 26 | 40 |

An average yield of 30 bush. 27 lbs. per acre.

EXPERIMENTAL FARM FOR THE N.W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Countess | 46 | 50 | 7. Admiral | 43 | 30 |
| 2. Gehun | 46 | 20 | 8. Red Fern | 43 | 30 |
| 3. Goose | 45 | 50 | 9. Beaudry | 43 | 10 |
| 4. Huron | 44 | 40 | 10. Rideau | 43 | 10 |
| 5. Emporium | 44 | .. | 11. Progress | 43 | 10 |
| 6. Dufferin | 43 | 30 | 12. White Connell | 43 | .. |

An average yield of 44 bush. 13 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Dawn | 30 | .. | 7. Old Red River | 27 | 20 |
| 2. Preston | 29 | 40 | 8. Campbell's White Chaff | 26 | 10 |
| 3. Herisson Bearded | 29 | 20 | 9. Dufferin | 25 | .. |
| 4. White Connell | 28 | 20 | 10. Wellman's Fife | 25 | .. |
| 5. Emporium | 28 | 20 | 11. Countess | 24 | .. |
| 6. Red Fern | 27 | 40 | 12. Monarch | 23 | 40 |

An average yield of 27 bush. 2 lbs. per acre.

The twelve varieties of spring wheat which have produced the largest crops, taking the average of the results obtained at all the experimental farms, are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 35 | 37 | 7. Wellman's Fife | 31 | 36 |
| 2. Monarch | 35 | 14 | 8. White Connell | 31 | 24 |
| 3. Goose | 34 | 36 | 9. Pringle's Champlain | 31 | 10 |
| 4. Rio Grande | 32 | 14 | 10. Old Red River | 31 | 8 |
| 5. Stanley | 31 | 50 | 11. Huron | 31 | 6 |
| 6. Red Fern | 31 | 46 | 12. Crown | 31 | 2 |

An average yield of 32 bush. 23 lbs. per acre.

The average crop of all the varieties of spring wheat tested at each of the experimental farms is as follows:—At Ottawa, 18 bush. 28 lbs.; Nappan, 41 bush. 46 lbs.; Brandon, 25 bush. 41 lbs.; Indian Head, 41 bush. 10 lbs., and at Agassiz, 22 bush, 34 lbs. The average return given by the whole of the varieties at all the farms is 29 bush. 56 lbs. per acre.

## PEASE.

Twenty-five varieties of pease have been under test during 1896. These were sown in plots of $\frac{1}{10}$th acre each at Brandon and Indian Head and $\frac{1}{20}$th acre each at Ottawa, Nappan and Agassiz. The quantity of seed sown per acre varied from two to three bushels, depending upon the size of the pea. The dates of sowing were as follows:—At Ottawa, 23rd April; Nappan, 6th May; Brandon, 11th May; Indian Head, 9th May, and at Agassiz, 1st April.

## UNIFORM TEST PLOTS OF PEASE.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1896. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Creeper.......... | 45 | 50 | 45 | .. | 52 | .. | 30 | 30 | 18 | 40 | 38 | 24 | 106 | 113 | 103 | 115 | 127 | 112 4/5 |
| 2 | Canadian Beauty. | 44 | 20 | 22 | .. | 47 | .. | 37 | 35 | 10 | .. | 32 | 11 | 111 | 107 | 107 | 109 | 127 | 125 1/5 |
| 3 | Agnes. . ....... | 44 | 20 | 45 | .. | 59 | 40 | 40 | .. | 21 | 40 | 42 | 8 | 103 | 114 | 108 | 116 | 120 | 112 1/5 |
| 4 | Bruce........... | 44 | .. | 40 | .. | 25 | 20 | 28 | 20 | 18 | 20 | 31 | 12 | 108 | 113 | 111 | 117 | 132 | 116 1/5 |
| 5 | Mackay.......... | 44 | .. | 40 | .. | 60 | 40 | 45 | .. | 14 | 40 | 40 | 52 | 107 | 113 | 109 | 117 | 136 | 116 2/5 |
| 6 | Kent............ | 43 | 20 | 40 | 40 | 61 | 40 | 35 | .. | 12 | .. | 38 | 32 | 112 | 114 | 108 | 115 | 136 | 117 |
| 7 | Black-eye Marrowfat......... | 42 | .. | 39 | 20 | 46 | 40 | 26 | 40 | 13 | .. | 33 | 32 | 107 | 113 | 112 | 109 | 132 | 114 3/5 |
| 8 | Duke............ | 42 | .. | 40 | 20 | 50 | 40 | 43 | .. | 13 | 20 | 37 | 52 | 110 | 114 | 108 | 115 | 132 | 115 4/5 |
| 9 | Crown.... ...... | 41 | 30 | 51 | .. | 55 | .. | 40 | .. | 12 | 40 | 40 | 2 | 105 | 108 | 96 | 104 | 132 | 109 |
| 10 | Golden Vine..... | 40 | 40 | 27 | 40 | .. | .. | 40 | .. | 15 | 40 | 31 | .. | 104 | 108 | .... | 104 | 126 | 110 2/5 |
| 11 | New Potter...... | 40 | 30 | 35 | 20 | 54 | 40 | 32 | 20 | 20 | .. | 36 | 46 | 106 | 111 | 106 | 104 | 133 | 112 |
| 12 | Prince Albert.... | 40 | 20 | 30 | .. | 52 | 40 | 40 | .. | 16 | 40 | 35 | 56 | 110 | 111 | 109 | 109 | 136 | 115 |
| 13 | Dan'l O'Rourke.. | 40 | 20 | 45 | 20 | 50 | 20 | 25 | .. | 17 | 40 | 35 | 40 | 102 | 113 | 98 | 107 | 114 | 106 4/5 |
| 14 | Mummy.......... | 40 | .. | 24 | 40 | 55 | 40 | 37 | 10 | 11 | 40 | 33 | 50 | 97 | 107 | 103 | 104 | 136 | 109 2/5 |
| 15 | Multiplier.. .. . | 39 | 40 | 30 | .. | 36 | 20 | 45 | .. | 12 | .. | 32 | 36 | 109 | 111 | 135 | 109 | 136 | 120 |
| 16 | Prince........... | 39 | 40 | 45 | .. | 60 | 40 | 36 | 40 | 15 | .. | 39 | 24 | 106 | 114 | 109 | 117 | 136 | 116 2/5 |
| 17 | Paragon......... | 39 | 20 | 45 | .. | 50 | 40 | 43 | 20 | 14 | 20 | 38 | 32 | 107 | 113 | 112 | 115 | 136 | 116 3/5 |
| 18 | Pride........... | 38 | 30 | 44 | 20 | 56 | .. | 33 | 20 | 12 | .. | 36 | 50 | 96 | 111 | 97 | 109 | 126 | 107 4/5 |
| 19 | Macoun......... | 37 | 20 | 44 | 20 | 17 | .. | 40 | .. | 14 | .. | 30 | 32 | 109 | 113 | 120 | 115 | 140 | 119 2/5 |
| 20 | Arthur.......... | 37 | 20 | 40 | 40 | 42 | .. | 34 | 40 | 27 | 20 | 36 | 24 | 103 | 108 | 109 | 107 | 126 | 110 3/5 |
| 21 | Trilby.......... | 37 | .. | 31 | 20 | 55 | 40 | 41 | 40 | 14 | 20 | 36 | .. | 109 | 108 | 107 | 117 | 136 | 115 2/5 |
| 22 | Centennial....... | 37 | .. | 35 | 40 | 52 | .. | 40 | .. | 20 | .. | 36 | 56 | 111 | 111 | 109 | 111 | 133 | 115 |
| 23 | Bedford......... | 36 | 20 | 47 | .. | 41 | 40 | 38 | 20 | 18 | 40 | 36 | 24 | 111 | 114 | 110 | 119 | 128 | 116 2/5 |
| 24 | Carleton......... | 35 | .. | 45 | 40 | 62 | .. | 56 | 40 | 20 | 40 | 44 | .. | 110 | 114 | 111 | 115 | 133 | 116 3/5 |
| 25 | Large White Marrowfat. | 34 | .. | 47 | .. | 44 | .. | 31 | 20 | 10 | 40 | 33 | 24 | 104 | 113 | 112 | 115 | 136 | 116 |

In this instance the records of varieties are complete with the exception of Golden Vine which was omitted at Brandon.

Among the varieties included in these tests of pease there are twelve of the cross-bred sorts which have been originated at the experimental farms. These are Agnes, Bruce, Mackay, Kent, Duke, Prince, Paragon, Macoun, Arthur, Trilby, Bedford and Carleton. These twelve new varieties have given the following average crops. At Ottawa 39 bush. 58 lbs. per acre ; Nappan, 41 bush. 5 lbs. ; Brandon, 48 bush. 58 lbs. ; Indian Head, 40 bush. 13 lbs. ; and at Agassiz, 17 bushels. The average results of all the tests of these cross-bred pease at all the farms is 37 bush. 26 lbs. per acre.

At Brandon the varieties named Macoun and Bedford were both much injured by a wind storm, otherwise the crop would have been larger.

The twelve varieties of pease which have produced the largest crops at the several experimental farms during 1896, are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Creeper | 45 | 50 | 7. Black Eyed Marrowfat | 42 | .. |
| 2. Canadian Beauty | 44 | 20 | 8. Duke | 42 | .. |
| 3. Agnes | 44 | 20 | 9. Crown | 41 | 30 |
| 4. Bruce | 44 | .. | 10. Golden Vine | 40 | 40 |
| 5. Mackay | 44 | .. | 11. New Potter | 40 | 30 |
| 6, Kent | 43 | 20 | 12. Prince Albert | 40 | 20 |

An average crop of 42 bush. 44 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 51 | .. | 7. Creeper | 45 | .. |
| 2. Large White Marrowfat | 47 | .. | 8. Agnes | 45 | .. |
| 3. Bedford | 47 | .. | 9. Prince | 45 | .. |
| 4. Carleton | 45 | 40 | 10. Pride | 44 | 20 |
| 5. Daniel O'Rourke | 45 | 20 | 11. Macoun | 44 | 20 |
| 6. Paragon | 45 | .. | 12. Kent | 40 | 40 |

An average crop of 45 bush. 26 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Carleton | 62 | .. | 7. Trilby | 55 | 40 |
| 2. Kent | 61 | 40 | 8. Mummy | 55 | 40 |
| 3. Mackay | 60 | 40 | 9. Crown | 55 | .. |
| 4. Prince | 60 | 40 | 10. New Potter | 54 | 40 |
| 5. Agnes | 59 | 40 | 11. Prince Albert | 52 | 40 |
| 6. Pride | 56 | .. | 12. Creeper | 52 | .. |

An average crop of 57 bush. 11 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Carleton | 56 | 40 | 7. Centennial | 40 | 30 |
| 2. Mackay | 45 | .. | 8. Golden Vine | 40 | 20 |
| 3. Multiplier | 45 | .. | 9. Prince Albert | 40 | 10 |
| 4. Paragon | 43 | 20 | 10. Crown | 40 | 3 |
| 5. Duke | 43 | .. | 11. Macoun | 40 | .. |
| 6. Trilby | 41 | 40 | 12. Agnes | 40 | .. |

An average crop of 42 bush. 58 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur, | 27 | 20 | 7. Creeper | 18 | 40 |
| 2. Agnes | 21 | 40 | 8. Bruce | 18 | 20 |
| 3. Carleton | 20 | 40 | 9. Daniel O'Rourke | 17 | 40 |
| 4. New Potter | 20 | .. | 10. Prince Albert | 16 | 40 |
| 5. Centennial | 20 | .. | 11. Golden Vine | 15 | 40 |
| 6. Bedford | 18 | 40 | 12. Prince | 15 | .. |

An average crop of 19 bush. 11 lbs. per acre.

The twelve varieties of pease which have produced the largest crops, taking the average of the results obtained at all the experimental farms, are :

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Carleton | 44 | .. | 7. Paragon | 38 | 32 |
| 2. Agnes | 42 | 8 | 8. Creeper | 38 | 24 |
| 3. Mackay | 40 | 52 | 9. Duke | 37 | 52 |
| 4. Crown | 40 | 2 | 10. Centennial | 36 | 56 |
| 5. Prince | 39 | 24 | 11. Pride | 36 | 50 |
| 6. Kent | 38 | 32 | 12. New Potter | 36 | 46 |

An average crop of 39 bush. 11 lbs. per acre.

The average crop of all the varieties of pease tested at each of the experimental farms is as follows :—At Ottawa, 40 bush. 10 lbs. per acre ; Nappan, 39 bush. 17 lbs. ; Brandon, 49 bush. 35 lbs. ; Indian Head, 37 bush. 42 lbs. and at Agassiz, 15 bush. 48 lbs. The average return given by the whole of the varieties at all the farms is 36 bush 30 lbs. per acre.

## INDIAN CORN.

Twenty varieties of Indian Corn have been under trial during 1896, all planted on the same day on uniform soil in rows three feet apart, and the plants thinned out to six or eight inches apart in the row. The dates of planting were as follows :—Ottawa, 23rd May ; Nappan, 22nd May ; Brandon, 23rd May ; Indian Head, 23rd May, and Agassiz, 18th May. All were cut green and put into the silo for winter feeding of stock. The dates of cutting were Ottawa, 10th September ; Nappan, 9th September ; Brandon, 19th August ; Indian Head, 31st August ; Agassiz, 29th September. The yield per acre has been calculated in each case from the weight obtained from two rows each 66 feet long.

UNIFORM TEST PLOTS OF INDIAN CORN GROWN IN ROWS.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1896. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Pride of the North | 20 | 1,672 | 17 | 1,310 | 23 | 200 | 10 | 900 | 11 | ...... | 16 | 1,216 |
| 2 | Leaming | 20 | 1,527 | 17 | 650 | 24 | 400 | 9 | 1,250 | 11 | 200 | 16 | 1,205 |
| 3 | Cuban Giant | 19 | 1,349 | 20 | 975 | 20 | 1,800 | 11 | 1,100 | 20 | 1,433 | 18 | 1,331 |
| 4 | Rural Thoroughbred White Flint. | 19 | 42 | 19 | 1,050 | 24 | 400 | 9 | 1,800 | 9 | 700 | 16 | 798 |
| 5 | Red Cob Ensilage | 18 | 736 | 12 | 640 | 23 | 200 | 10 | 680 | 8 | 966 | 14 | 1,044 |
| 6 | Compton's Early | 16 | 670 | 17 | 630 | 19 | 500 | 11 | 110 | 11 | 1,700 | 15 | 322 |
| 7 | Pearce's Prolific | 16 | 525 | 16 | 175 | 26 | 800 | 8 | 1,820 | 6 | 1,570 | 14 | 1,778 |
| 8 | Giant Prolific Ensilage. | 16 | 234 | 14 | 1,150 | 19 | 1,600 | 9 | 1,800 | 8 | 1,600 | 13 | 1,676 |
| 9 | Champion White Pearl | 15 | 1,944 | 14 | 1,590 | 18 | 1,400 | 8 | 1,600 | 6 | 1,000 | 12 | 1,906 |
| 10 | Longfellow | 15 | 1,364 | 16 | 725 | 30 | 500 | 7 | 1,290 | 14 | 1,700 | 16 | 1,915 |
| 11 | Mammoth Eight-rowed Flint | 15 | 1,073 | 14 | 1,700 | 19 | 500 | 9 | 1,140 | 8 | 500 | 13 | 982 |
| 12 | White Cap Yellow Dent | 15 | 601 | 12 | 640 | 16 | 1,000 | 9 | 810 | 12 | 300 | 13 | 270 |
| 13 | Sanford | 15 | 274 | 18 | 850 | 23 | 200 | 11 | 550 | 8 | 866 | 15 | 548 |
| 14 | King of the Earliest | 14 | 858 | 15 | 1,350 | 22 | ..... | 9 | 920 | 7 | 800 | 13 | 1,585 |
| 15 | Early Huron Dent | 14 | 96 | 12 | 1,850 | 21 | 900 | 10 | 900 | 7 | 720 | 13 | 493 |
| 16 | Canada White Flint | 14 | 24 | 16 | 560 | 24 | 1,500 | 9 | 1,580 | 8 | 1,233 | 14 | 1,379 |
| 17 | Angel of Midnight | 13 | 1,443 | 16 | 175 | 36 | 600 | 9 | 1,580 | 13 | 1,500 | 17 | 1,859 |
| 18 | Country Gentleman | 10 | 1,853 | 7 | 1,840 | 20 | 1,800 | 9 | 1,580 | 4 | 1,900 | 10 | 1,794 |
| 19 | North Dakota. | 10 | 1,635 | .... | ..... | 26 | 800 | 8 | 1,600 | 6 | 836 | 13 | 218 |
| 20 | Mitchell's Extra Early | 10 | 1,635 | 11 | 825 | 21 | 900 | 9 | 150 | 3 | 1,340 | 11 | 570 |

The records of the test of varieties of corn are complete with the exception of the North Dakota which was omitted at Nappan because the seed did not arrive in time for planting.

The six varieties of Indian corn which have given the heaviest crops at the several experimental farms, during 1896, are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Pride of the North | 20 | 1,672 | 4. Rural Thoro'bred White Flint | 19 | 42 |
| 2. Leaming | 20 | 1,527 | 5. Red Cob Ensilage | 18 | 736 |
| 3. Cuban Giant | 19 | 1,349 | 6. Compton's Early | 16 | 670 |

An average crop of 19 tons 332 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Cuban Giant | 20 | 975 | 4. Pride of the North | 17 | 1,310 |
| 2. Rural Thoro'bred White Flint | 19 | 1,050 | 5. Leaming | 17 | 650 |
| 3. Sanford | 18 | 850 | 6. Compton's Early | 17 | 630 |

An average crop of 18 tons 911 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Angel of Midnight | 36 | 600 | 4. North Dakota | 26 | 800 |
| 2. Longfellow | 30 | 500 | 5. Canada White Flint | 24 | 1,500 |
| 3. Pearce's Prolific | 26 | 800 | 6. Rural Thoro'bred White Flint | 24 | 400 |

An average crop of 28 tons 100 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Cuban Giant | 11 | 1,100 | 4. Early Huron Dent | 10 | 900 |
| 2. Sanford | 11 | 550 | 5. Pride of the North | 10 | 900 |
| 3. Compton's Early | 11 | 110 | 6. Red Cob Ensilage | 10 | 680 |

An average crop of 10 tons 1,707 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Cuban Giant | 20 | 1,433 | 4. White Cap Yellow Dent | 12 | 300 |
| 2. Longfellow | 14 | 1,700 | 5. Compton's Early | 11 | 1,700 |
| 3. Angel of Midnight | 13 | 500 | 6. Leaming | 11 | 200 |

An average crop of 13 tons 1972 lbs. per acre.

The six varieties of Indian corn which have produced the largest crops, taking the average of the results of all the experimental farms, are:—

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Cuban Giant | 18 | 1,331 | 4. Pride of the North | 16 | 1,216 |
| 2. Angel of Midnight | 17 | 1,859 | 5. Leaming | 16 | 1,205 |
| 3. Longfellow | 16 | 1,915 | 6. Thoroughbred White Flint | 16 | 798 |

An average crop of 17 tons 387 lbs. per acre.

The Cuban Giant which stands at the head of this list is a large growing dent variety which does not mature well at any of the experimental farms and hence is much less valuable for fodder than the other sorts which stand below it in the list.

The average weight, cut green, of all the varieties of Indian corn tested at each of the experimental farms is as follows:—At Ottawa, 15 tons 1,377 lbs. per acre; Nappan. 15 tons 772 lbs.; Brandon, 23 tons 200 lbs.; Indian Head, 9 tons 1,558 lbs., and at Agassiz, 9 tons 1,043 lbs. The average return given by the whole of the varieties at all the farms is 14 tons 1,390 lbs. per acre.

## TURNIPS.

Fourteen varieties of turnips have been under test during 1896, all sown on drills or on the flat in rows, 2½ feet apart. Two sowings were made at each farm about two weeks apart. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows:—At Ottawa, 15th October; Nappan, 23rd October; Brandon, 8th October; Indian Head, 6th October, and Agassiz, 26th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

# UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | | Sown May 22. | | Sown May 27. | | Sown June 5. | | Sown May 18. | | Sown May 25. | | Sown May 30. | | Sown June 13. | | Sown May 9. | | Sown May 23. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Hartley's Bronze ..... ... | 45 | 90 | 30 | 1,710 | 34 | 150 | 32 | 1,800 | 31 | 700 | 19 | 808 | 23 | 332 | 18 | 960 | 17 | 1,200 | 17 | 1,000 | 30 | 494 | 23 | 1,656 |
| 2 | Carter's Elephant ......... | 41 | 335 | 28 | 1,090 | 34 | 150 | 35 | 500 | 19 | 940 | 16 | 1,528 | 19 | 280 | 14 | 1,580 | 13 | 400 | 14 | 600 | 25 | 821 | 21 | 1,860 |
| 3 | Purple Top Swede......... | 40 | 1,180 | 29 | 740 | 38 | 1,550 | 35 | 500 | 26 | 1,460 | 16 | 472 | 24 | 840 | 21 | 1,560 | 15 | 712 | 13 | 244 | 29 | 348 | 23 | 303 |
| 4 | Mammoth Clyde. ... ... . | 37 | 250 | 25 | 215 | 34 | 150 | 34 | 150 | 25 | 556 | 25 | 160 | 20 | 920 | 16 | 460 | 12 | 1,558 | 12 | 992 | 25 | 1,887 | 22 | 1,195 |
| 5 | Perfection ................ | 37 | 250 | 21 | 570 | 37 | 1,200 | 29 | 750 | 28 | 1,420 | 23 | 728 | 23 | 1,520 | 19 | 1,336 | 13 | 576 | 13 | 1,016 | 28 | 193 | 21 | 880 |
| 6 | Giant King................ | 36 | 600 | 25 | 1,535 | 29 | 400 | 29 | 400 | 20 | 1,976 | 17 | 320 | 18 | 1,500 | 18 | 180 | 22 | ..... | 20 | 216 | 25 | 895 | 22 | 130 |
| 7 | Prize Purple Top.......... | 34 | 1,630 | 22 | 220 | 27 | 990 | 31 | 1,450 | 17 | 1,640 | 18 | 1,224 | 19 | 1,960 | 17 | 560 | 17 | 1,728 | 15 | 536 | 23 | 1,190 | 20 | 1,998 |
| 8 | Marquis of Lorne......... | 33 | 660 | 23 | 1,190 | 30 | 1,450 | 30 | 1,100 | 18 | 1,092 | 18 | 960 | 19 | 280 | 15 | 1,680 | 15 | 888 | 15 | 1,328 | 23 | 874 | 20 | 1,652 |
| 9 | Jumbo or Monarch ........ | 33 | 330 | 21 | 1,615 | 29 | 1,690 | 30 | 1,100 | 19 | 148 | 16 | 1,792 | 18 | 660 | 13 | 940 | 24 | 280 | 22 | 1,760 | 24 | 1,822 | 21 | 241 |
| 10 | Prize Winner.............. | 32 | 1,395 | 23 | 860 | 28 | 400 | 32 | 1,800 | 27 | 1,968 | 18 | 1,488 | 21 | 1,560 | 19 | 16 | 13 | 136 | 13 | 1,368 | 24 | 1,492 | 21 | 1,106 |
| 11 | Selected Champion ........ | 32 | 1,010 | 20 | 1,910 | 34 | 150 | 29 | 1,690 | 22 | 1,012 | 19 | 280 | 21 | 240 | 19 | 1,640 | 12 | 1,256 | 12 | 904 | 24 | 1,134 | 20 | 885 |
| 12 | East Lothian.............. | 31 | 425 | 21 | 1,230 | 28 | 1,140 | 29 | 750 | 26 | 1,724 | 16 | 208 | 18 | 420 | 16 | 700 | 17 | 1,200 | 18 | 80 | 24 | 982 | 20 | 594 |
| 13 | Sutton's Champion ....... | 30 | 1,380 | 22 | 880 | 30 | 1.450 | 30 | 1,570 | 21 | 1,296 | 19 | 280 | 19 | 280 | 14 | 1,580 | 17 | 1,468 | 15 | 448 | 23 | 1,975 | 20 | 952 |
| 14 | Skirving's.. ......... ..... | 28 | 485 | 21 | 1,670 | 32 | 1,800 | 29 | 750 | 25 | 1,876 | 25 | 1,480 | 21 | 1,560 | 18 | 1,752 | 12 | 1,784 | 12 | 1,432 | 24 | 705 | 21 | 1,417 |

The crops from the successive growings of turnips at the experimental farms have averaged as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., first sowing......... | 35 | 573 |
| do do do second sowing......... | 24 | 388 |
| Experimental Farm, Nappan, N.S., first sowing.............. | 35 | 1,476 |
| do do second sowing.... ....... | 31 | 1,022 |
| do Brandon, Man., first sowing.... ......... | 23 | 1,558 |
| Experimental Farm, Brandon, Man., second sowing.......... | 19 | 695 |
| do Indian Head, N.W.T., first sowing. ..... | 20 | 1,311 |
| do do second sowing.... | 17 | 924 |
| do Agassiz, B.C., first sowing.............. | 16 | 227 |
| do do second sowing............ | 15 | 994 |

Average crop from all the plots at all the farms, first sowing, 26 tons 629 lbs.; second sowing 21 tons 1,205 lbs.

It will be seen that the first sowing of turnips at each of the experimental farms has given the larger crop, the average of all the sowings at all the farms is 4 tons 1,424 lbs. per acre more from the first sowing than it is from the second.

The six varieties of turnips which have produced the heaviest crops at the several experimental farms during 1896 are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze, 1st sowing... | 45 | 90 | 4. Mammoth Clyde, 1st sowing.... | 37 | 250 |
| 2. Carter's Elephant “ ... | 41 | 355 | 5. Perfection “ .... | 37 | 250 |
| 3. Purple Top Swede “ ... | 40 | 1180 | 6. Giant King “ .... | 36 | 600 |

An average crop of 39 tons 1,117 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 2. Purple Top Swede, 1st sowing.. | 38 | 1550 | 4. Hartley's Bronze, 1st sowing... | 34 | 150 |
| 1. Perfection “ .. | 37 | 1200 | 5. Selected Champion “ ... | 34 | 150 |
| 3. Carter's Elephant, 2nd sowing.. | 35 | 500 | 6. Prize Winner, 2nd sowing...... | 32 | 1800 |

An average crop of 35 tons 888 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze, 1st sowing... | 31 | 700 | 4. East Lothian, 1st sowing...... | 26 | 1724 |
| 2. Perfection “ ... | 28 | 1460 | 5. Purple Top Swede “ ...... | 26 | 1460 |
| 3. Prize Winner “ ... | 27 | 1968 | 6. Mammoth Clyde “ ...... | 25 | 556 |

An average crop of 27 tons 1,644 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Purple Top Swede, 1st sowing.. | 24 | 840 | 4. Prize Winner, 1st sowing...... | 21 | 1560 |
| 2. Perfection “ .. | 23 | 1520 | 5. Skirving's “ ...... | 21 | 1560 |
| 3. Hartley's Bronze “ .. | 23 | 332 | 6. Selected Champion “ ...... | 21 | 240 |

An average crop of 22 tons 1,342 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Jumbo or Monarch, 1st sowing.. | 24 | 280 | 4. Sutton's Champion, 1st sowing.. | 17 | 1468 |
| 2. East Lothian, 2nd sowing...... | 18 | 80 | 5. Hartley's Bronze “ .. | 17 | 1200 |
| 3. Prize Purple Top, 1st sowing... | 17 | 1728 | 6. Marquis of Lorne, 2nd sowing.. | 15 | 1328 |

An average crop of 18 tons 1,014 lbs. per acre.

The six varieties of turnips which have produced the largest crops, taking the average of the results obtained at all the experimental farms are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze.............. | 23 | 1656 | 4. Giant King .... ........... | 22 | 130 |
| 2. Purple Top Swede............. | 23 | 303 | 5. Carter's Elephant............. | 21 | 1860 |
| 3. Mammoth Clyde........... ... | 22 | 1195 | 6. Skirving's..................... | 21 | 1417 |

Average of 22 tons 1,093 lbs. per acre.

## MANGELS.

Thirteen varieties of mangels were under test during 1896, all sown on drills or on the flat in rows $2\frac{1}{2}$ feet apart. Two sowings were made at each farm, the second sowing about two weeks after the first. The dates of sowing will be found in the accompanying table, the dates on which the roots wêre pulled were as follows .—At Ottawa, 15th October ; Nappan, 23rd October ; Brandon, 3rd October ; Indian Head, 30th September, and Agassiz, 24th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | | Sown May 22. | | Sown May 22. | | Sown June 5. | | Sown May 16. | | Sown June 1. | | Sown May 30. | | Sown June 13. | | Sown April 28. | | Sown May 12. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Mamm. Long Red (Evans).. | 40 | 1,840 | 35 | 1,610 | 29 | 575 | 21 | 1,800 | 36 | 1,920 | 32 | 1,208 | 15 | 360 | 12 | 1,080 | ......... | | ......... | | 30 | 1,174 | 25 | 1,424 |
| 2 | Gate Post.... ........ .... | 40 | 520 | 29 | 1,565 | 27 | 250 | 26 | 500 | 43 | 1,120 | 34 | 640 | 14 | 1,304 | 10 | 1,648 | 26 | 1,944 | 19 | 1,424 | 30 | 1,028 | 24 | 355 |
| 3 | Yellow Intermediate. .... | 38 | 285 | 35 | 1,995 | 29 | 1,500 | 32 | 750 | 38 | 1,616 | 21 | 1,824 | 15 | 1,152 | 14 | 1,040 | 39 | 1,200 | 32 | 1,824 | 32 | 751 | 27 | 1,087 |
| 4 | Giant Yellow Intermediate. | 37 | 635 | 32 | 1,395 | 28 | 940 | 25 | 1,100 | 43 | 1,618 | 33 | 792 | 15 | 756 | 11 | 1,628 | 23 | 532 | 18 | 1,664 | 29 | 1,302 | 24 | 916 |
| 5 | Red Fleshed Globe ........ | 36 | 1,095 | 24 | 1,555 | 26 | 925 | 21 | 1,800 | 32 | 680 | 26 | 272 | 16 | 736 | 10 | 1,780 | ......... | | ......... | | 27 | 1,859 | 20 | 1,852 |
| 6 | Warden Orange Globe...... | 36 | 985 | 27 | 120 | 33 | 1,200 | 24 | 1,000 | 30 | 720 | 26 | 1,328 | 13 | 1,720 | 16 | 1,528 | 23 | 728 | 26 | 536 | 27 | 1,071 | 24 | 502 |
| 7 | Red Fleshed Tankard...... | 36 | 665 | 23 | 475 | 20 | 1,245 | 18 | 1,230 | 29 | 1,664 | 14 | 1,832 | 15 | 888 | 13 | 400 | 22 | 1,8[illegible]8 | 19 | 1,864 | 25 | 62 | 17 | 1,960 |
| 8 | Giant Yellow Globe........ | 35 | 950 | 29 | 1,400 | 29 | 400 | 24 | 1,285 | 37 | 184 | 26 | 1,064 | 15 | 1,548 | 15 | 624 | 27 | 824 | 25 | 1,656 | 28 | 1,981 | 24 | 806 |
| 9 | Golden Fleshed Tankard... | 34 | 565 | 31 | 370 | 23 | 550 | 26 | 500 | 31 | 1,888 | 27 | 1,176 | 15 | 228 | 11 | 176 | 26 | 1,592 | 25 | 600 | 26 | 525 | 24 | 564 |
| 10 | Mamm. Long Red (Webb). | 32 | 1,725 | 28 | 650 | 27 | 750 | 23 | 720 | 52 | 1,600 | 34 | 1,168 | 15 | 1,812 | 11 | 440 | 35 | 224 | 33 | ...... | 32 | 1,622 | 26 | 196 |
| 11 | Champion Yellow Globe... | 31 | 975 | 28 | 1,420 | 24 | 545 | 20 | 150 | 41 | 1,688 | 28 | 1,288 | 16 | 736 | 12 | 24 | 22 | 1,672 | 17 | 1,024 | 27 | 723 | 21 | 781 |
| 12 | Mamm. Long Red (Steele). | 30 | 5 | 19 | 1,985 | 25 | 1,100 | 21 | 1,800 | 43 | 1,120 | 35 | 1,016 | 15 | 1,152 | 14 | 512 | 27 | 296 | 24 | 224 | 28 | 734 | 23 | 307 |
| 13 | Canadian Giant........... | 25 | 1,450 | 20 | 1,910 | 21 | 1,500 | 26 | 500 | 37 | 960 | 34 | 112 | 13 | 400 | 13 | 1,456 | 22 | ........ | 21 | 1,824 | 24 | 62 | 23 | 760 |

The Mammoth Long Red (Evans) and the Red Fleshed Globe were omitted at Agassiz, for the reason that the seed was not received in time for sowing.

The successive sowings of Mangels at the experimental farms have averaged as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, first sowing.... ........ | 35 | 858 |
| do do do second sowing........... | 28 | 524 |
| Experimental Farm, Nappan, N.S., first sowing......... ..... | 26 | 1,344 |
| do do second sowing........... | 24 | 241 |
| do Brandon, Man., first sowing............. | 38 | 1,992 |
| Experimental Farm, Brandon, Man, second sowing....... .... | 29 | 438 |
| do Indian Head, N.W.T., first sowing....... | 15 | 501 |
| do do second sowing..... | 12 | 1,608 |
| do Agassiz, B.C., first sowing......... ..... | 27 | 56 |
| do do second sowing ...... .... | 24 | 241 |

Average crop from all the plots on all the farms: First sowing, 28 tons 1,192 lbs.; second sowing, 23 tons 1302 lbs.

With the mangels also the early sown plots have given the larger crops, the earlier sowings having given an average of 4 tons 1,890 lbs. per acre more than that obtained from the later sowings.

The six varieties of mangels which have produced the heaviest crops at the several experimental farms during 1896, are the following :—

### Central Experimental Farm Ottawa, Ont.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Mamm. Long Red (Evan's) 1st sowing | 40 | 1,840 |
| 2. Gate Post, 1st sowing | 40 | 520 |
| 3. Yellow Intermediate, 1st sowing | 38 | 285 |
| 4. Giant Yellow Intermediate 1st sowing | 37 | 635 |
| 5. Red Fleshed Globe, 1st sowing | 36 | 1,095 |
| 6. Warden Orange Globe, 1st sowing | 36 | 985 |

An average crop of 38 tons 560 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Warden Orange Globe, 1st sowing | 33 | 1,200 |
| 2. Yellow Intermediate, 2nd sowing | 32 | 750 |
| | 32 | 750 |
| 3. Mamm. Long Red (Evans), 1st sowing | 29 | 575 |
| 4. Giant Yellow Globe, 1st sowing | 29 | 400 |
| 5. Giant Yellow Intermediate, 1st sowing | 28 | 940 |
| 6. Mamm. Long Red (Webb), 1st sowing | 27 | 750 |

An average crop of 30 tons 102 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1, Mamm. Long Red (Webb) 1st sowing | 52 | 1,600 |
| 2. Giant Yellow Intermediate, 1st sowing | 43 | 1,648 |
| 3. Mamm. Long Red (Steele), 1st sowing | 43 | 1,120 |
| 4. Gate Post, 1st sowing | 43 | 1,120 |
| 5. Champion Yellow Globe, 1st sowing | 41 | 1,688 |
| 6. Yellow Intermediate, 1st sowing | 38 | 1,616 |

An average crop of 44 tons 132 lbs. per acre.

### Experimental Farm for the N. W. Territories, Indian Head, N.W.T.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Warden Orange Globe, 2nd sowing | 16 | 1,528 |
| 2. Red Fleshed Globe, 1st sowing | 16 | 736 |
| 3. Champion Yellow Globe, 1st sowing | 16 | 736 |
| 4. Mamm. Long Red (Steele), 1st sowing | 15 | 1,812 |
| 5. Giant Yellow Globe, 1st sowing | 15 | 1,548 |
| 6. Yellow Intermediate, 1st sowing | 15 | 1,152 |

An average crop of 16 tons 252 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Yellow Intermediate, 1st sowing | 39 | 1,200 |
| 2. Mamm. Long Red (Webb), 1st sowing | 35 | 224 |
| 3. Giant Yellow Globe, 1st sowing | 27 | 824 |
| 4. Mamm. Long Red (Steele) 1st sowing | 27 | 296 |
| 5. Gate Post, 1st sowing | 26 | 1,944 |
| 6. Warden Orange Globe, 2nd sowing | 26 | 536 |

An average crop of 30 tons 837 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops taking the average of the results obtained at all the experimental farms are :

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate........ | 32 | 751 | 4. Gate Post.................. | 30 | 1,028 |
| 2. Mamm. Long Red (Webb)... | 32 | 1,622 | 5. Giant Yellow Intermediate.. | 29 | 1,302 |
| 3. Mamm. Long Red (Evans).. | 30 | 1,174 | 6. Red Fleshed Tankard....... | 28 | 1,981 |

An average crop of 30 tons 837 lbs. per acre.

## CARROTS.

Fourteen varieties of carrots were tested during 1896, all sown in rows or on the flat, two feet apart. Two sowings were made in each case, the second sowing about two weeks after the first, excepting at Indian Head, where the second sowing was omitted. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows—At Ottawa, 15th October; Nappan, 20th October; Brandon, 5th October; Indian Head, 5th October, and at Agassiz, 23rd October. The yield per acre in each instance has been calculated from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | | Sown May 22. | | Sown May 22. | | Sown June 5. | | Sown May 16. | | Sown June 2. | | Sown May 18. | | Sown April 24. | | Sown May 8. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | White Belgian | 31 | 1,470 | 20 | 1,250 | 16 | 900 | 12 | 1,850 | 23 | 860 | 16 | 1,000 | 12 | 948 | 19 | 866 | 18 | 1,390 | 20 | 1,409 | 16 | 1,872 |
| 2 | Improved Short White | 28 | 1,860 | 24 | 290 | 19 | 540 | 18 | 1,050 | 19 | 500 | 16 | 1,880 | 12 | 156 | 26 | 700 | 25 | 500 | 21 | 351 | 20 | 1,944 |
| 3 | Iverson's Champion | 28 | 1,090 | 24 | 510 | 17 | 1,250 | 15 | 550 | 25 | 380 | 20 | 480 | 13 | 131 | 13 | 400 | 23 | 933 | 19 | 1,050 | 20 | 1,618 |
| 4 | Half Long White | 28 | 760 | 27 | 1,880 | 18 | 1,600 | 14 | 200 | 24 | 1,280 | 20 | 40 | 13 | 1,852 | 24 | 400 | 19 | 1,306 | 22 | 473 | 20 | 856 |
| 5 | Giant Yellow Intermediate | 27 | 505 | 20 | 260 | 14 | 200 | 10 | 1,150 | 21 | 1,120 | 21 | 240 | 10 | 724 | 22 | ... | 23 | 1,666 | 19 | 110 | 18 | 1,829 |
| 6 | Half Long Chantenay | 27 | 110 | 22 | 1,870 | 18 | 1,050 | 12 | 1,850 | 22 | 440 | 13 | 400 | 13 | 1,192 | 19 | 133 | 17 | 1,200 | 20 | 185 | 16 | 1,330 |
| 7 | Mammoth White Intermediate | 26 | 1,790 | 24 | 1,555 | 19 | 1,950 | 18 | 1,600 | 22 | 1,980 | 16 | 1,003 | 13 | 268 | 22 | .... | 21 | 1,800 | 20 | 1,998 | 20 | 989 |
| 8 | Giant White Vosges | 24 | 1,830 | 20 | 315 | 15 | 550 | 11 | 1,500 | 24 | 1,500 | 20 | 1,800 | 11 | 1,364 | 20 | 1,060 | 19 | 1,600 | 19 | 861 | 15 | 1,304 |
| 9 | Early Gem | 24 | 840 | 21 | 295 | 17 | 1,300 | 14 | 200 | 27 | 1,880 | 18 | 1,400 | 10 | 1,648 | 19 | 133 | 18 | 666 | 19 | 1,960 | 18 | 140 |
| 10 | Guerande or Oxheart | 24 | 565 | 22 | 1,870 | 17 | 1,250 | 14 | 200 | 24 | 620 | 21 | 1,560 | 11 | 1,364 | 18 | 666 | 14 | 1,333 | 19 | 493 | 18 | 741 |
| 11 | Carter's Orange Giant | 24 | 180 | 18 | 685 | 16 | 900 | 9 | 800 | 17 | 1,200 | 11 | 440 | 9 | 1,800 | 16 | 1,733 | 15 | 800 | 16 | 1,963 | 13 | 1,181 |
| 12 | Scarlet Intermediate | 20 | 1,305 | 17 | 980 | 10 | 210 | 11 | 1,500 | 20 | 1,800 | 12 | 200 | 10 | 592 | 9 | 1,926 | 9 | 1,077 | 14 | 767 | 12 | 1,439 |
| 13 | Long Orange or Surrey | 17 | 650 | 15 | 1,350 | 11 | 1,500 | 10 | 210 | 18 | 300 | 16 | 1,880 | 7 | 1,444 | 14 | 1,383 | 13 | 1,866 | 13 | 1,855 | 14 | 326 |
| 14 | Long Scarlet Altringham | 16 | 1,880 | 16 | 1,660 | 14 | 200 | 11 | 1,500 | 13 | 1,060 | 13 | 840 | 8 | 1,556 | 16 | 1,733 | 14 | 1,333 | 14 | 86 | 14 | 568 |

The successive sowings of carrots at the experimental farms have averaged as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., 1st sowing | 25 | 202 |
| do do 2nd sowing | 21 | 484 |
| Experimental Farm, Nappan, N.S., 1st sowing | 16 | 529 |
| do do 2nd sowing | 14 | 583 |
| do Brandon, Man., 1st sowing | 21 | 1,780 |
| Experimental Farm, Brandon, Man., 2nd sowing | 16 | 1,571 |
| do Indian Head, N.W.T., 1st sowing only | 11 | 788 |
| do Agassiz, B.C., 1st sowing | 18 | 1,509 |
| do do 2nd sowing | 18 | 676 |

Average crop from all the plots on all the farms, excepting Indian Head: first sowing, 20 tons 1,005 lbs.; second sowing, 17 tons 1,328 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops at the several experimental farms during 1896 are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. White Belgian, 1st sowing ... | 31 | 1,470 | 4. Half Long White, 1st sowing. | 28 | 760 |
| 2. Improved Short White, 1st sowing ........ | 28 | 1,860 | 5. Giant Yellow Intermediate, 1st sowing ........ | 27 | 505 |
| 3. Iverson's Champion, 1st sowing ........ | 28 | 1,090 | 6. Half Long Chantenay, 1st sowing ........ | 27 | 110 |

An average crop of 28 tons 1,299 lbs. per acre

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate, 1st sowing ........ | 19 | 1,950 | 4. Half Long Chantenay, 1st sowing ........ | 18 | 1,050 |
| 2. Improved Short White, 1st sowing ........ | 19 | 546 | 5. Early Gem, 1st sowing ....... | 17 | 1,300 |
| 3. Half Long White, 1st sowing. | 18 | 1,600 | 6. Guerande or Oxheart, 1st sowing ........ | 17 | 1,250 |

An average crop of 18 tons 1,281 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Gem, 1st sowing ....... | 27 | 1,880 | 4. Half Long White, 1st sowing. | 24 | 1,280 |
| 2. Iverson's Champion, 1st sowing ........ | 25 | 380 | 5. Guerande or Oxheart, 1st sowing ........ | 24 | 620 |
| 3. Giant White Vosges, 1st sowing ........ | 24 | 1,500 | 6. White Belgian, 1st sowing ... | 23 | 860 |

An average crop of 25 tons 86 lbs. per acre.

EXPERIMENTAL FARM FOR THE N. W. TERRITORIES, INDIAN HEAD, N.W.T.

*One sowing only.*

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White ........... | 13 | 1,852 | 4. Iverson's Champion ......... | 13 | 131 |
| 2. Half Long Chantenay ........ | 13 | 1,192 | 5. White Belgian ............... | 12 | 948 |
| 3. Mamm. White Intermediate . | 13 | 268 | 6. Improved Short White....... | 12 | 156 |

An average crop of 13 tons 91 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White, 1st sowing ........ | 26 | 700 | 4. Iverson's Champion, 2nd sowing ........ | 23 | 933 |
| 2. Half Long White, 1st sowing. | 24 | 400 | 5. Mamm. White Intermediate, 1st sowing ........ | 22 | .... |
| 3. Giant Yellow Intermediate, 2nd sowing ........ | 23 | 1,666 | 6. Giant White Vosges, 1st sow'g. | 20 | 1,060 |

An average crop of 23 tons 793 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops, taking the average of the results obtained at all the experimental farms, are :

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White ........... | 22 | 473 | 4. Iverson's Champion ......... | 20 | 1,645 |
| 2. Improved Short White....... | 21 | 351 | 5. White Belgian .............. | 20 | 1,409 |
| 3. Mamm. White Intermediate . | 20 | 1,998 | 6. Half Long Chantenay........ | 20 | 188 |

An average crop of 21 tons 10 lbs. per acre.

## POTATOES.

Eighty-three varieties of potatoes were under trial in uniform plots during 1896. The potatoes for planting were cut into pieces with two or three eyes in each and these were planted in rows $2\frac{1}{2}$ feet apart, the sets being a foot apart in the rows. The dates of planting were as follows:—At Ottawa, 21st and 22nd May; Nappan, 20th May; Brandon, 21st May; Indian Head, 18th May, and at Agassiz, 14th May. The yield per acre has been calculated in each case from the weight of tubers gathered from two rows each 66 feet long.

### UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | |
| | | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs. |
| 1 | Late Puritan | 455 | 24 | 308 | .. | 454 | 40 | 345 | 24 | 139 | 20 | 340 | 34 |
| 2 | Holborn Abundance | 404 | 48 | 536 | 40 | .... | ..... | 283 | 48 | 44 | .. | 317 | 19 |
| 3 | I. X. L. | 377 | 51 | 490 | .. | 502 | 20 | 290 | 24 | 115 | 40 | 355 | 15 |
| 4 | Dreer's Standard | 375 | 6 | 501 | 40 | 344 | 40 | 312 | 24 | 39 | 36 | 314 | 41 |
| 5 | Carman No. 1 | 371 | 48 | 501 | 40 | 440 | .. | 345 | 24 | 161 | 20 | 364 | 2 |
| 6 | Clay Rose | 355 | 18 | 380 | 20 | ....... | .. | 279 | 24 | 205 | 20 | 305 | 5 |
| 7 | American Wonder | 353 | 6 | 408 | 20 | 344 | 40 | 413 | 36 | 102 | 40 | 324 | 28 |
| 8 | Polaris | 351 | 4 | 441 | 40 | 473 | .. | 301 | 24 | 176 | .. | 348 | 45 |
| 9 | Everett | 350 | 54 | 280 | .. | 480 | 20 | 334 | 24 | 124 | 40 | 314 | 4 |
| 10 | Burnaby Seedling | 346 | 30 | 511 | .. | 348 | 20 | 268 | 24 | 117 | 20 | 318 | 19 |
| 11 | Empire State | 344 | 18 | 536 | 40 | 454 | 40 | 389 | 24 | 96 | 48 | 364 | 22 |
| 12 | Ideal | 341 | .. | 361 | 40 | 326 | 20 | 294 | 28 | 109 | 16 | 286 | 33 |
| 13 | American Giant | 341 | .. | 408 | 20 | 308 | .. | 376 | 12 | 168 | 40 | 320 | 22 |
| 14 | Irish Daisy | 337 | 42 | 529 | 40 | 484 | .. | 301 | 24 | 130 | 32 | 356 | 40 |
| 15 | Early Harvest | 337 | 42 | 396 | 40 | 366 | 40 | 314 | 36 | 102 | 20 | 303 | 36 |
| 16 | State of Maine | 336 | 36 | 466 | 40 | 410 | 40 | 321 | 12 | 95 | 40 | 326 | 9 |
| 17 | Rochester Rose | 327 | 48 | 550 | .. | 344 | 40 | 246 | 24 | 198 | .. | 333 | 22 |
| 18 | McKenzie | 320 | 6 | 490 | .. | 370 | 20 | 279 | 24 | 161 | 20 | 344 | 44 |
| 19 | Pride of the Table | 317 | 54 | 273 | .. | 330 | .. | 250 | 48 | .. | ...... | 292 | 55 |
| 20 | Seedling No. 230 | 316 | 48 | 583 | .. | 341 | .. | 272 | 48 | 220 | .. | 346 | 43 |
| 21 | Rural Blush | 316 | 48 | 455 | .. | 531 | 40 | 294 | 28 | 154 | .. | 350 | 23 |
| 22 | Brownell's Winner | 312 | 24 | 326 | 40 | 374 | .. | 369 | 36 | 146 | 20 | 305 | 48 |
| 23 | Hale's Champion | 311 | 18 | 382 | 40 | 396 | .. | 239 | 48 | 132 | .. | 292 | 21 |
| 24 | New Variety No. 1 | 309 | 6 | 254 | 20 | 355 | 40 | 299 | 12 | 132 | .. | 270 | 4 |
| 25 | Monroe County | 308 | .. | 478 | 20 | 341 | .. | 316 | 48 | 164 | 16 | 321 | 40 |
| 26 | Seattle | 305 | 48 | 452 | 40 | 267 | 40 | 279 | 24 | 102 | 40 | 281 | 38 |
| 27 | Chicago Market | 304 | 42 | 429 | 20 | 396 | .. | 248 | 36 | 147 | 20 | 305 | 12 |
| 28 | Flemish Beauty Seedling | 304 | 42 | ...... | ..... | 465 | 40 | 259 | 36 | 95 | 20 | 281 | 19 |
| 29 | Troy Seedling | 299 | 12 | 443 | 20 | 344 | .. | 310 | 12 | 103 | 58 | 300 | 8 |
| 30 | Early Sunrise | 294 | 48 | 408 | 20 | 517 | .. | 286 | .. | 110 | .. | 323 | 14 |
| 31 | Daisy | 293 | 42 | 473 | 40 | 458 | 20 | 297 | .. | 110 | 20 | 326 | 36 |
| 32 | Orphans | 289 | 13 | 396 | 40 | 242 | .. | 198 | .. | 146 | 40 | 254 | 31 |
| 33 | Pride of the Market | 287 | 6 | 560 | .. | 469 | 20 | 301 | 24 | 183 | 20 | 360 | 14 |
| 34 | General Gordon | 286 | .. | 471 | 20 | 363 | .. | 276 | 42 | 176 | .. | 314 | 36 |
| 35 | Brown's Rot-proof | 283 | 48 | 235 | .. | 275 | .. | 132 | .. | .... | ..... | 231 | 27 |
| 36 | New Queen | 282 | 42 | 420 | .. | 421 | 40 | 341 | .. | 66 | .. | 306 | 16 |
| 37 | Crown Jewel | 280 | 30 | 492 | 20 | 396 | .. | 332 | 12 | 132 | .. | 326 | 36 |
| 38 | Money-maker | 279 | 24 | 493 | 40 | 440 | .. | 332 | 12 | 205 | 20 | 350 | 7 |
| 39 | Vick's Extra Early | 279 | 21 | 361 | 40 | 201 | 40 | 310 | 12 | .... | .... | 288 | 14 |
| 40 | Peerless Junior | 275 | .. | 408 | 20 | 242 | .. | 237 | 36 | 103 | 24 | 253 | 16 |
| 41 | Delaware | 275 | .. | 413 | .. | 366 | 40 | 244 | 12 | 176 | .. | 294 | 58 |
| 42 | Vanier | 275 | .. | 408 | 20 | 344 | 40 | 248 | 36 | 161 | 20 | 287 | 35 |
| 43 | Russell's Seedling | 275 | .. | 490 | .. | 242 | .. | 226 | 36 | 161 | 20 | 278 | 59 |
| 44 | Early Gem | 269 | 30 | 378 | 40 | 429 | .. | 310 | 12 | 145 | 50 | 305 | 38 |

UNIFORM TEST OF POTATOES—*Concluded.*

| Number. | Name of Variety. | Ottawa, Ont. Per acre. | | Nappan, N.S. Per acre. | | Brandon, Man. Per acre. | | Indian Head, N.W.T. Per acre. | | Agassiz, B.C. Per acre. | | Average of all Farms. Per acre. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs |
| 45 | Stourbridge Glory... | 268 | 24 | 431 | 40 | 326 | 20 | 217 | 48 | 110 | 44 | 270 | 59 |
| 46 | Early Rose........ | 265 | 28 | 338 | 20 | 366 | 40 | 244 | 12 | 140 | 40 | 271 | 4 |
| 47 | Pearce's Extra Early. | 265 | 6 | 242 | 40 | 601 | 20 | 281 | 36 | 132 | 40 | 304 | 40 |
| 48 | Satisfaction........ | 264 | .. | 273 | .. | 293 | 20 | 206 | 48 | 146 | 40 | 236 | 46 |
| 49 | Early Ohio.......... | 261 | 48 | 368 | 40 | 355 | 40 | 206 | 48 | 117 | 20 | 262 | 3 |
| 50 | Earliest of All....... | 260 | 42 | 168 | . | 377 | 40 | 253 | .. | 95 | 20 | 230 | 56 |
| 51 | Prize Taker......... | 259 | 36 | 443 | 20 | 359 | 20 | 253 | .. | 102 | 40 | 283 | 35 |
| 52 | Great Divide........ | 256 | 18 | 415 | 20 | 436 | 20 | 261 | 48 | 110 | .. | 295 | 57 |
| 53 | Northern Spy....... | 255 | 12 | 478 | 20 | 377 | 40 | 270 | 36 | 126 | 8 | 301 | 35 |
| 54 | Maggie Murphy..... | 253 | .. | 380 | 20 | 363 | .. | 290 | 24 | 132 | .. | 283 | 45 |
| 55 | Thorburn.......... | 249 | 42 | 525 | .. | 377 | 40 | 195 | 48 | 117 | 20 | 293 | 6 |
| 56 | Early White Prize... | 247 | 52 | 443 | 20 | 487 | 40 | 279 | 24 | 139 | 20 | 319 | 31 |
| 57 | Early Six-weeks..... | 247 | 30 | 410 | 40 | 377 | 40 | 224 | 24 | 73 | 20 | 266 | 43 |
| 58 | Victor Rose......... | 245 | 18 | 415 | 20 | 319 | .. | 312 | 24 | 117 | 20 | 281 | 52 |
| 59 | Beauty of Hebron... | 245 | 18 | 499 | 20 | 454 | 40 | 312 | 24 | 154 | .. | 333 | 8 |
| 60 | Early Norther...... | 242 | .. | 420 | .. | 513 | 20 | 242 | .. | 132 | .. | 309 | 52 |
| 61 | Lee's Favourite..... | 239 | 48 | 413 | .. | 418 | .. | 345 | 24 | ........ | | 354 | 3 |
| 62 | Green Mountain..... | 235 | 24 | 548 | 20 | 311 | 40 | 261 | 48 | 154 | .. | 302 | 14 |
| 63 | Chas. Downing...... | 233 | 12 | 490 | .. | 381 | 20 | 261 | 48 | ........ | | 341 | 35 |
| 64 | Sharpe's Seedling.... | 231 | 44 | 332 | .. | 341 | . | 292 | 36 | 108 | 32 | 261 | 10 |
| 65 | Reading Giant ..... | 231 | .. | 462 | .. | 385 | .. | 246 | 24 | 117 | 40 | 288 | 25 |
| 66 | Wonder of the World | 229 | 54 | 361 | 40 | 447 | 20 | 272 | 48 | 73 | 20 | 277 | .. |
| 67 | White Beauty....... | 228 | 48 | 457 | 20 | 469 | 20 | 237 | 36 | 95 | 20 | 297 | 41 |
| 68 | Clarke's No. 1.... | 227 | 20 | 433 | 20 | 458 | 20 | 288 | 12 | 66 | .. | 294 | 38 |
| 69 | Dakota Red......... | 224 | 24 | 445 | 40 | 278 | 40 | 281 | 36 | 184 | 40 | 283 | .. |
| 70 | London............. | 221 | 6 | 382 | 40 | 399 | 40 | 376 | 12 | 80 | 40 | 292 | 4 |
| 71 | Queen of the Valley.. | 217 | 48 | 466 | 40 | 396 | .. | 217 | 48 | 133 | 28 | 286 | 21 |
| 72 | Seedling No. 214.... | 206 | 48 | 237 | .. | 201 | 40 | 224 | 24 | 95 | 30 | 193 | 4 |
| 73 | Hopeful. ........ | 204 | 36 | 396 | 40 | 282 | 20 | 220 | .. | 58 | 28 | 232 | 25 |
| 74 | Lizzie's Pride........ | 203 | 30 | 455 | .. | 436 | 20 | 369 | 36 | 70 | 20 | 306 | 57 |
| 75 | Early Puritan....... | 201 | 18 | 560 | .. | 506 | .. | 336 | 36 | 105 | 36 | 341 | 54 |
| 76 | Freeman........... | 199 | 6 | 361 | 40 | 322 | 40 | 217 | 48 | 146 | 40 | 249 | 35 |
| 77 | Table King......... | 198 | .. | 354 | 40 | 201 | 40 | 127 | 36 | 58 | 40 | 188 | 7 |
| 78 | Record.......... | 198 | .. | 420 | .. | 333 | 40 | 187 | .. | 148 | 52 | 257 | 30 |
| 79 | Burpee's Extra Early | 195 | 48 | 168 | .. | 330 | .. | 312 | 24 | 117 | 20 | 224 | 42 |
| 80 | World's Fair..... .. | 189 | 12 | 466 | 40 | 484 | .. | 169 | 24 | ......... | | 327 | 19 |
| 81 | Algoma No. 1....... | 181 | 30 | 256 | 40 | 297 | .. | 246 | 24 | ......... | | 245 | 23 |
| 82 | Harbinger.... ... | 159 | 30 | 361 | 40 | 275 | .. | 237 | 36 | 95 | 20 | 225 | 49 |
| 83 | Pearce's Prize Winner | 159 | 30 | 459 | 40 | 498 | 40 | 314 | 36 | 88 | .. | 304 | 5 |

The following were omitted because the tubers did not arrive in time to be planted with the others; at Brandon, Clay Rose and at Agassiz Pride of the Table, Brown's Rot-proof, Vicks Extra Early, Lee's Favourite, Chas. Downing, Worlds Fair and Algoma No. 1.

The twelve varieties of potatoes which have produced the largest crops at the several experimental farms are:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Late Puritan............... | 455 | 24 | 7. American Wonder......... | 353 | 6 |
| 2. Holborn Abundance........ | 404 | 48 | 8. Polaris.................... | 351 | 4 |
| 3. I. X. L.................... | 377 | 51 | 9. Everett................... | 350 | 54 |
| 4. Dreer's Standard.......... | 375 | 6 | 10. Burnaby Seedling.... .... | 346 | 30 |
| 5. Carman No. 1. ........... | 371 | 48 | 11. Empire State.............. | 344 | 18 |
| 6. Clay Rose............ .... | 355 | 18 | 12. Ideal..................... | 341 | .. |

An average crop of 368 bushels 55 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling No. 230 | 583 | .. | 7. Irish Daisy | 529 | 40 |
| 2. Early Puritan | 560 | .. | 8. Thorburn | 525 | .. |
| 3. Pride of the Market | 560 | .. | 9. Late Puritan | 513 | 20 |
| 4. Green Mountain | 548 | 20 | 10. Burnaby Seedling | 511 | .. |
| 5. Holborn Abundance | 536 | 40 | 11. Dreer's Standard | 501 | 40 |
| 6. Empire State | 536 | 40 | 12. Carman No. 1 | 501 | 40 |

An average crop of 533 bush. 55 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pearce's Extra Early | 601 | 20 | 7. Pearce's Prize Winner | 498 | 20 |
| 2. Rural Blush | 531 | 40 | 8. Early White Prize | 487 | 40 |
| 3. Early Sunrise | 517 | .. | 9. World's Fair | 484 | .. |
| 4. Early Norther | 513 | 20 | 10. Irish Daisy | 484 | .. |
| 5. Early Puritan | 506 | .. | 11. Everett | 480 | 20 |
| 6. I. X. L | 502 | 20 | 12. Polaris | 473 | .. |

An average crop of 506 bush. 35 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Wonder | 413 | 36 | 7. Vanguard | 367 | 24 |
| 2. Empire State | 389 | 24 | 8. Late Puritan | 345 | 24 |
| 3. American Giant | 376 | 12 | 9. Lee's Favourite | 345 | 24 |
| 4. London | 376 | 12 | 10. Carman No. 1 | 345 | 24 |
| 5. Brownell's Winner | 369 | 36 | 11. New Queen | 341 | .. |
| 6. Lizzie's Pride | 369 | 36 | 12. Everett | 336 | 36 |

An average crop of 364 bush. 39 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling No. 230 | 220 | .. | 7. Polaris | 176 | .. |
| 2. Clay Rose | 205 | 20 | 8. Delaware | 176 | .. |
| 3. Moneymaker | 205 | 20 | 9. General Gordon | 176 | .. |
| 4. Rochester Rose | 198 | .. | 10. American Giant | 168 | 40 |
| 5. Dakota Red | 184 | 40 | 11. Monroe Co | 164 | 16 |
| 6. Pride of the Market | 183 | 20 | 12. Carman No. 1 | 161 | 20 |

An average crop of 184 bush. 54 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops, taking the average of the results of all the experimental farms, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Empire State | 364 | 22 | 7. Rural Blush | 350 | 23 |
| 2. Carman No. 1 | 364 | 2 | 8. Moneymaker | 350 | 7 |
| 3. Pride of the Market | 360 | 14 | 9. Polaris | 348 | 45 |
| 4. Irish Daisy | 356 | 40 | 10. Seedling No. 330 | 346 | 43 |
| 5. I. X. L. | 355 | 15 | 11. McKenzie | 344 | 45 |
| 6. Lee's Favourite | 354 | 3 | 12. Early Puritan | 341 | 54 |

An average crop of 353 bush. 6 lbs. per acre.

The average crop of all the varieties of potatoes tested at each of the experimental farms is as follows:—At Ottawa, 276 bush. 41 lbs. per acre; Nappan, 415 bush. 34 lbs.; Brandon, 380 bush. 49 lbs.; Indian Head, 277 bush. 14 lbs.; and at Agassiz, 125 bush. 7 lbs. The average return given by the whole of the varieties at all the farms is 295 bush. 5 lbs.

## CONCLUSIONS.

The results presented in this bulletin show wide variations in the weight of crop obtained from different varieties of the same sort of grain, fodder, corn or roots, when grown side by side on similar soil and under like conditions. The extent of these differences are indicated in the accompanying table where the largest and smallest crops obtained from each class of product under test are given. As proof that these variations are not exceptional, the results obtained in 1895 are also presented.

| — | Season of 1896. | | | Season of 1895. | | |
|---|---|---|---|---|---|---|
| | Largest Crop per Acre. | Smallest Crop per Acre. | Difference in Crop per Acre. | Largest Crop per Acre. | Smallest Crop per Acre. | Difference in Crop per Acre. |
| | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. |
| Oats | 85·10 | 45·10 | 40·0 | 74·4 | 16·6 | 57·22 |
| Barley, two-rowed | 51·2 | 34·38 | 16·12 | 43·16 | 20·8 | 23·8 |
| do six-rowed | 69·8 | 41·2 | 28·6 | 58·6 | 32 14 | 25·26 |
| Spring Wheat | 24·20 | 9·0 | 15·20 | 30·40 | 13·40 | 17·0 |
| Pease | 45·50 | 34·0 | 11·50 | 40·10 | 30·20 | 9·50 |
| Potatoes | 455·24 | 159·30 | 295·54 | 385·0 | 133·50 | 251·9 |
| | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. |
| Indian Corn (cut green for silo) | 20·1672 | 10·1635 | 10·37 | 37·470 | 13·1280 | 23·1190 |
| Turnips | 45·90 | 28 485 | 16·1605 | 13·400 | 6·408 | 7·888 |
| Mangels | 40·1840 | 25·1480 | 15·360 | 37·976 | 22·682 | 15·294 |
| Carrots | 31·1470 | 16·1880 | 14·1590 | 29·1400 | 11·1100 | 18·300 |

These experiences show the importance of selecting for seed such varieties as have proven most vigorous and productive. Since nearly all the work undertaken at the experimental farms has for its main object the gaining and disseminating of such information as is likely to make farming in Canada more profitable, it is hoped that farmers generally will carefully consider and take advantage of the experience here recorded, and as far as is practicable make their choice of seed for next season's sowing from among those varieties which have given the best results in these tests.

Some idea may be formed of the gain which would accrue to the farmers of the Dominion from the addition of a single bushel of grain or ton of corn or roots per acre under crop of these farm products by referring to the following table where the acreage is given under cultivation with each crop in the single province of Ontario in 1896, and a calculation made of the money value of such addition at prices current in the markets of the east.

The acreage given is taken from bulletin 60 of the Ontario Bureau of Industries.

| — | Area under Crop in Ontario, 1896. | Estimated value per bushel. | Value of each Bushel per Acre of Increase for Ontario only. |
|---|---|---|---|
| | Acres. | cts. | $ cts. |
| Oats | 2,425,107 | 25 | 606,276 75 |
| Barley | 462,792 | 35 | 161,977 20 |
| Spring Wheat | 255,361 | 75 | 191,520 75 |
| Pease | 829,601 | 50 | 414,800 50 |
| Potatoes | 178,985 | 20 | 35,797 00 |
| | | PerTon. | Value of each Ton per Acre of Increase. |
| | | $ cts. | $ cts. |
| Indian Corn (cut green for silo) | 178,962 | 1 50 | 268,443 00 |
| Turnips | 148,234 | 3 00 | 447,702 00 |
| Mangels | 36,101 | 3 00 | 108,303 00 |
| Carrots | 12,333 | 3 00 | 36,999 00 |

Particular attention is also called to the increase of crop had from early seedings of turnips, mangels and carrots.

As many of the more promising sorts of grain are not yet easily obtained, instructions have been given by the Hon. Minister of Agriculture to distribute this season as heretofore, in 3 lb. bags, all the surplus seed grain available from the crops harvested at the experimental farms. These bags will be sent free to farmers in Canada on application, but owing to the very large number who now apply, it is not practicable to send more than one sample to each applicant. Last year about 40,000 farmers sent requests for samples, of which 36,000 were supplied before the stock was exhausted, and more than 50 tons of choice seed grain were used in meeting this demand. The available stock this year is somewhat larger than in 1895, and the distribution as in the past will consist of samples of oats, wheat, barley, pease, corn and potatoes. No provision has been made for the distribution of turnip, mangel or carrot seeds.

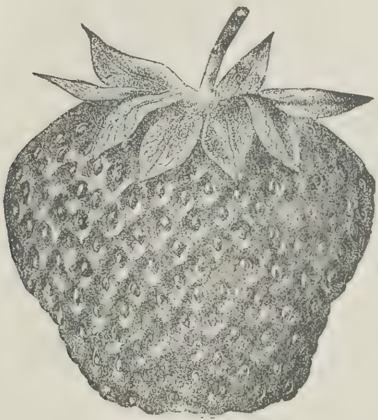
It is desirable that each applicant should express his preference for the particular variety he desires to test and to name one or two alternative sorts in case the stock of the variety chosen should be exhausted. The new cross-bred and hybrid sorts are not yet available in sufficient quantity to admit of general distribution, but a limited number in each province can be supplied with samples of one pound each. The distribution is now in progress, and requests may be sent to the Central Experimental Farm, Ottawa, free of postage, at any time before the 1st of March, but after that date the lists will be closed, so that the applications then on hand may be filled before seeding begins. Those who apply for potatoes should also have their applications in before the date named, but the samples cannot be sent until danger of injury from frost is over.

# CENTRAL EXPERIMENTAL FARM.

:o:

DEPARTMENT OF AGRICULTURE,

OTTAWA - - - - CANADA.



## BULLETIN No. 27.

:o:

# STRAWBERRIES.

:o:

JUNE, 1897.

To the Honourable
The Minister of Agriculture.

SIR,—I beg to submit for your approval Bulletin No. 27, of the Experimental Farm Series, which has been prepared under my direction by Mr. John Craig, Horticulturist of the Central Experimental Farm.

The rapid extension of strawberry growing has resulted in the production of very large crops of this valuable fruit, especially in the eastern provinces of the Dominion, and almost everywhere strawberries have come into very general use. The ease with which new varieties of this fruit are produced from seed, has resulted in the introduction during the past few years of a large number of new sorts. Facts regarding the quality, productiveness and general usefulness of these as compared with the best of the older varieties are presented in this bulletin in accordance with the experience gained by tests made at the Central Experimental Farm. The best method of preparing the soil and particulars regarding the most successful treatment to secure an abundant crop are fully explained, and remedies suggested for the more common diseases to which the plants are subject.

The fact that this useful fruit can be grown so universally, makes it the more important that practical knowledge as to the best methods of cultivation and the most profitable sorts to grow should be generally disseminated. It is hoped that the information given in this bulletin will aid in encouraging farmers to grow this healthful fruit more generally. Where the use of a plot of ground can be easily had, there seems no good reason why every family should not have an ample supply of strawberries during the warm weather of early summer when such an addition to the diet is most agreeable and healthful.

I have the honour to be,
Your obedient servant.

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, June 7th, 1897.

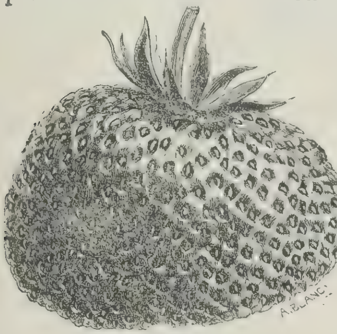
# STRAWBERRIES.

(By John Craig.)

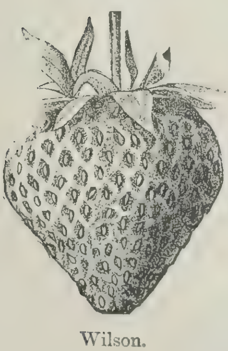
A bulletin (No. 5) was issued on this subject in August, 1889, by Mr. W. W. Hilborn, then Horticulturist of the Central Experimental Farm. This bulletin discussed cultural methods, in addition to giving descriptions of a number of the leading varieties of that time. It is not intended to repeat in the following pages the descriptive notes on varieties already given by Mr. Hilborn, but rather to record experience gained since that time in testing new with old varieties, in addition to giving such collateral data deduced from experiments, bearing upon successful strawberry culture, as have come under our notice.

### INTRODUCTION OF NEW VARIETIES.

The ease with which strawberries may be grown from seed, favours the production of new varieties. Each year sees a large crop of seedlings offered with great confidence by strawberry specialists to the public with the assurance that they are possessed of valuable characteristics. The percentage which live through a five years' test is comparatively small and is confined to those having a wide range of adaptability. Many varieties much advertised and widely planted five or six years ago, like Jessie, for instance, have since been almost lost sight of, while other kinds, as Crescent and Wilson, commercial standards at that time, are still found to be more largely cultivated in strawberry growing localities than those of recent production. This is on account of the unstable character of the new kinds. Some are placed upon the market in advance of a thorough test, while others only succeed on certain soils.



Jessie.



Wilson.

### QUALITIES OF A GOOD VARIETY.

A variety should not be introduced unless possessing, in a marked degree, a characteristic, or characteristics, which stamps it as superior to varieties already upon the market. Among the desirable qualities to be sought for are, first, quality in fruit; this includes fine flavour, firm texture, attractive colour and desirable form. Second, vigour in the plant; including productiveness, hardiness and freedom from disease. Bright and glossy berries, like Martha, Middlefield, and New Dominion, are usually firmer and bear transportation better than the non-glossy kinds with seeds depressed.

Some berries will always be prized by the amateur, while they will be found unprofitable in the commercial plantation, and *vice versa*. On the

whole, it is best to separate fruits into two classes, by making a more or less arbitrary division, based upon quality and productiveness—those fulfilling the demands of the amateur on the one hand, and the needs of the commercial grower on the other. In the annual reports of the Horticulturist of the Central Farm, facts relative to the condition and yield of varieties under trial have been given from year to year. It has been thought advisable to repeat these records in part, in connection with the present article.

### STRAWBERRY CULTURE AT LARGE.

Ten years ago strawberry growing was restricted mainly to certain localities supposed to possess in a marked degree favouring conditions. Many localities now growing them freely were supposed at that time to be entirely uncongenial and their culture was not attempted—this is particularly true of the Ottawa district. Since that time the increase in the number of varieties, improvement in quality and general diffusion of knowledge with regard to culture and means of transportation have done much towards extending the industry. There are still certain centres like Picton, in Prince Edward County, Ontario; along the St. Lawrence River and the eastern shores of Lake Ontario, where the industry has in a large measure become a specialized feature of rural labour. It is safe to say that strawberries may be grown successfully in sufficient quantities for home use in all the agricultural portions of Ontario and eastern Canada. In Manitoba and the North-west Territories special precautions must be taken in summer to protect the plants from winds and drought, and extra protection given in winter to guard against severe cold.

### METHODS OF CULTURE.

The following instructions referring to the planting and care of strawberries when grown for home use as well as for market purposes were given in Bulletin No. 5, by Mr. Hilborn, and are repeated in the following pages (small type) for the reason that the issue of this Bulletin is now exhausted :—

#### SOIL.

"Any soil that will produce a good crop of potatoes or other vegetables will answer for strawberries. It should be well drained, either naturally or by tile drains. A rich clay loam is preferable and will usually give the largest yield, but the fruit will not ripen as early as on sandy loam. Avoid if possible a stiff, heavy clay. While a clay loam will give the best results if properly managed, it will not prove satisfactory unless it is well drained and the soil thoroughly prepared in the autumn previous to planting.

#### PREPARATION OF THE SOIL.

"For profitable growing on a large scale, select, if possible, a piece of well drained clay loam. This should receive a heavy coating of manure in the spring and then be either summer-fallowed or planted with potatoes, vegetables, or some other early crop which can be removed in time to permit of a proper preparation of the land in autumn before it becomes too wet with fall rains. A sub-soiler (see illustration) should follow the common plough,—one that will stir up the sub-soil to the depth of five to ten inches without bringing any of it to the top. Subsoiling is not absolutely necessary, but land thus loosened up will retain moisture longer in time of drought and dry off much more rapidly after heavy rains. The last ploughing in the fall should be thoroughly done and suitable furrows provided, so that all surface water may run off quickly. Early in the spring, as soon as the weather and the condition of the soil will permit, cultivate deeply both lengthwise and crosswise with a two-horse cultivator; harrow down smooth and the land will be ready for planting. Avoid ploughing a heavy soil in the spring for immediate planting.

Gravelly or sandy loam should be heavily manured in the spring, and may be planted with vegetables. All weeds should be kept down during the summer. Plough in the fall and again in the following spring, and harrow thoroughly. No

subsequent tillage will make up for inadequate preparation of the soil for strawberry culture. A stiff clay loam is more difficult to manage than sandy loam. A crop of clover or other green manure turned under will help to make the soil more friable. Coarse barn-yard manure should also be used whenever it can be applied in time to decompose and become well mixed with the soil before planting. Tile drains in such soil require to be much nearer together and should not be too deep, usually not much more than two and a-half feet. In the autumn, before the land becomes too wet, trench it up in high narrow ridges; if done with the plough, turn two furrows together forming a sharp ridge as when prepared for carrots or other roots. Surface drains should be made to take off surplus water quickly. When thus exposed to the action of the frost, a comparatively heavy soil will work down fine and mellow in the spring and give good results. Care must be taken, however, never to stir such soil when wet, either with hoe, plough or cultivator.

### TIME TO PLANT.

"Plant as early in the spring as the land can be prepared, as this gives the whole season for growth, and enables the plants to produce a full crop the following year. Fall planting, if done in August, will yield a small crop the following spring, but seldom enough to pay for the extra labour required. (This has been proved by an extensive experiment carried on in 1892 and 1893 J.C.) The principal objection to fall planting is that the plants do not make sufficient root growth to prevent them from lifting in the soil with the repeated freezing and thawing to which they are exposed during the winter and early spring. In any locality where no difficulty is likely to occur from this cause, autumn planting may often be practiced with advantage.

### HILL SYSTEM.

"For a city garden, where land is usually scarce, the hill system will generally give very satisfactory results. Plant in rows two feet apart and twelve to fifteen inches apart in the row. Cut off all runners before they have time to take root, thus enabling the plants to make strong stools or hills by the end of the growing season. Any blossoms which appear the same season of planting should be removed. In an unfavourable locality, where much alternate freezing and thawing is likely to occur during winter and early spring, growing in hills is not always successful, as they are more likely to heave with the frost, and the plants do not afford the same protection to each other as when planted in matted rows.

### MATTED ROWS.

"For this mode of culture, the rows require to be from two and a half to four feet apart, and the plants twelve to fifteen inches apart in the row. Cut off any blossoms which may appear, also the first runners, until the plants have gained sufficient vigour to send out several strong runners at once, when they should be allowed to take root and form a matted row from six to twelve inches in width. All free growing sorts make too many plants and should have all surplus runners cut off. The plants should not be crowded in the row. From three to six inches apart each way will give the required protection to each other and room to produce fruit of a large size and in abundance.

"There is probably no other class of the community so poorly provided with this fruit as farmers. This should not be the case, as strawberries can be grown with so little expense and trouble, that no one who has land should be without a sufficient supply. Much difficulty has been experienced by some in keeping up a strawberry plot for family use, for the reason that the usual method has been to plant strawberries in some out-of-the-way corner or inclosure where all the work has to be done by hand, and where they rarely get any attention after the first season, except to gather such fruit as may ripen. By the end of the third season the plants will generally be so exhausted, that but little fruit is produced, and the young plants seldom possess that vigour required for starting another plantation successfully, hence they are often given up as too troublesome.

"If the following system is adopted, a crop of strawberries can be grown with little risk of failure:—Select the best piece of land procurable, where the plants can be cultivated with a horse cultivator in the same manner as corn or potatoes For a family of ten or twelve persons, four rows two hundred feet long will give an ample supply for from three to five weeks, if suitable varieties are selected and reasonable cultivation given. Suppose the plot chosen to be forty feet wide and two hundred feet long. Plant four rows, covering one-half of the plot, as early in the spring as possible, four feet apart and one foot apart in the rows.

"Cut off all the blossoms and first runners until the plants have sufficient strength to send out several strong runners at once (which is usually in July) when these may

be allowed to take root. Stir the soil occassionally with the cultivator and keep the ground free from weeds. The second half of the plot should be well manured and planted with potatoes, and after these are dug in the fall the land should be prepared for planting in the following spring. Plants of the best quality can be obtained from those first planted for this second plot. By following this system a full crop of fruit can be gathered in about fourteen months from the time of planting.

"As soon as the berries are picked, plough up the first plantation, add manure and again prepare the land for planting the following spring. But one crop of fruit is taken from the plants and less time is required in putting out a new plot every spring than in cleaning out the old one. With this method there is no difficulty in keeping up a supply of strong and vigorous plants for replanting—a most important point in successful strawberry culture. A plantation can be made to bear well for several seasons by cleaning out the rows as soon as the last fruit is gathered, cutting them down to about six inches in width and giving thorough cultivation until the autumn; but more experience is required to manage the plants under this method than with the renewal plan.

"One row each of the following varieties:—Crescent, Wilson, Warfield and Parker Earle will make a collection that will give a succession of fruit for a month in a favourable season. In any locality where other sorts are known to succeed and are more easily obtained, they can be used in place of those named. It is of great importance to procure plants as near home as possible, or from those who will take much care in packing them. Failure is often due to the careless handling of the plants while out of the ground or to want of care in packing them.

## PLANTING.

After the land has been well prepared, mark off with a corn marker, or stretch a line to plant by. Take pains to have the rows straight; it adds to the appearance of the plot and time is also saved in the cultivation. Trim off all dead leaves and old runners from the plants; shorten the roots to three or four inches, keep them moist and where the wind cannot reach them while out of the ground. When planting, make a hole deep enough to admit the roots without doubling them up. Take the plant in the left hand, place the crown on a level with the surrounding soil, spread the roots out fan-shaped, fill in the soil, working it in among them, and press so firmly that by giving a quick jerk on a leaf it will break off without moving the plant. Only plants of the previous year's growth should be used.

Fig. 1.

Fig. 1 shows the correct way of setting the plant. In fig. 2, the roots are all in a bunch instead of being spread out evenly as in fig. 1. They cannot, therefore, make such a vigorous growth. When planted too deep, as in fig. 3, they are nearly always smothered and will rot off at the crown. In fig. 4, the crown is above the level of the surrounding soil and therefore too high. When thus planted they generally wither and die in a few days."

## AN EXPERIMENT IN SETTING PLANTS.

In setting out the new plantation in the fall of 1890, two methods of planting were adopted. Half the number of plants of each variety were planted in the ordinary way, that is by (1) making a hole deep enough to admit the roots without doubling them up, then spreading them carefully in all directions as much as possible, filling in the soil by hand, taking care to compact it firmly; (2) by setting them in a cleft made with a spade. To do this the spade was struck into the ground across the line of the row. Into this cleft the roots were inserted fan-shaped, and spread as much as the opening would admit, and the earth then packed well about them. This method requires a man and boy—the former to operate the spade, the latter to set the plants—and is much more rapid than the old style.

Results secured were:

1. A perfect stand of plants was obtained from both methods.
2. No difference in the health and vigour of the plants comprising the two sets was noticed.

The sub-soiler following the plough.

A spring planting. Photographed July 4th.

3. The spade method being more rapid, cheaper and equally satisfactory, is therefore recommended, especially in setting commercial plantations. Commercial growers, use in many instances, strong trowels, and plant alongside a garden line.


Fig. 2.


Fig. 3.


Fig. 4.

## CULTIVATION.

"Nearly all soils are full of weed seeds. When these germinate and appear above ground, cultivation should begin. Frequent stirring of the soil will destroy these weeds, and during drought will cause sufficient moisture to be retained in the soil to enable the plants to make a strong growth.

"Never allow weeds to grow in the strawberry patch. Cultivate carefully and thoroughly. By running the cultivator the same way every time, the plants that are newly rooted will not be so readily disturbed. Care must be taken not to stir the soil immediately around the plants, especially early in the season, as this is often the cause of their making feeble growth.

## MULCHING.

"The crop of strawberries will very much depend on how well the plants have been protected during the winter and early spring. It is not the severe freezing that injures the plants so much as the oft-repeated freezing and thawing. The use of a mulch of coarse manure, marsh hay, or clean wheat straw, is most effectual in preventing injury from this cause. Oat straw generally packs too closely and does not admit air freely enough to either soil or plants, especially on heavy land. As soon as the ground freezes in the autumn sufficiently hard to prevent horses and wagon from breaking through the crust, the mulch should be applied. Most of the material should be placed between the rows with just enough immediately over the plants to nearly cover them from sight. Before growth begins in the spring, draw the covering off from the plants and let it remain between the rows until after the fruit has been gathered; it thus serves the triple purpose of keeping the fruit clean, the soil cool and causes it also to retain longer the moisture gathered early in the season—which is all-important to the production of a large crop of fruit.

"In localities where late frosts are likely to occur at the time of blossoming, the mulch should be removed just before growth begins in spring and very shallow cultivation given. The soil becomes warmer when thus loosened and the blossoms often escape a frost, when the land is thus treated, which would otherwise injure them to a considerable extent.

## MULCHING EXPERIMENT.

On well drained sandy loam, particularly in localities where the snowfall is heavy, the advantages of mulching are not so apparent, and occasionally it is unnecessary. In the fall of 1893 an experiment in mulching—that is, giving winter protection—was tried on soil of this description. The results as shown below are in favour of non-mulching. Half of the plants

of each row made up of the following varieties was covered with wheat straw after the surface ground was stiffened by frost in the autumn :—

| Variety. | Condition. — Mulched. | Spring, 1894. — Not mulched. |
|---|---|---|
| Royal Hautbois | $\frac{1}{3}$ to $\frac{1}{2}$ killed... | $\frac{1}{4}$ killed. |
| Miller's Seedling, O. 2 | $\frac{1}{3}$ to $\frac{1}{2}$ " ... | $\frac{1}{3}$ " |
| Pineapple | $\frac{1}{4}$ " ... | $\frac{1}{4}$ " |
| Warfield No. 2 | $\frac{1}{10}$ " ... | $\frac{1}{10}$ " |
| Belmont | $\frac{1}{2}$ " ... | $\frac{1}{4}$ " |
| Cohansick | $\frac{1}{3}$ " ... | $\frac{1}{4}$ " |

The unmulched plants appeared to be stronger in the spring than those mulched. Later in the summer there was little difference. It is undoubtedly safer, notwithstanding the above results, one year with another, to cover the plants. Last winter was fatal to plants in nearly all unprotected beds in the Ottawa Valley.

### BLOSSOMS.

Fig 5. Bi-sexual.

"Strawberry blossoms are divided into two classes, 1st, bi-sexual or perfect. These contain stamens or male organs, and pistils or female organs, as in Fig. 5, hence are called perfect or bi-sexual, marked thus (B). 2nd, pistillate or imperfect, which contain pistils only, or female organs, as in fig. 6.

"Pistillate varieties usually yield the largest crops of fruit when properly fertilized. This may be effected by planting one or more rows of a perfect-flowering sort to every four or five rows of those with imperfect blossoms."

### GENERAL REMARKS.

Fig. 6. Pistillate.

Among the many errors which beginners in strawberry growing may fall into, none is attended with more serious consequences than that of limiting a plantation to a single variety, and that one not bi-sexual. At the beginning of the picking season last year, I was requested by a young strawberry grower in this vicinity to visit and examine his grounds for the purpose of investigating the cause of the unproductiveness of his thrifty plants. As the plants were in flower it required only a glance to arrive at a solution of the problem. The plants were nearly, if not quite all of a pronounced pistillate type. Therefore the unfruitfulness was due to the inability of the blossom to fertilize itself. He was advised at once to replace every third or fourth row with a strong growing free producer of pollen like Capt. Jack, New Dominion, Beder Wood or Williams. It is well known that the pistillate varieties under favourable circumstances are the most productive, and the mistake came about in this instance, by the grower making up his new plantation entirely of the variety which had been most productive in the old. Another point which it is well to remember in commercial berry growing, is that the early berries are by far the most profitable. It is not here, meant to convey the idea that the earliest varieties bring the most money because these are often comparatively unproductive, but rather that the plantation furnishing the bulk of its berries in the fore part of the season, is far more profitable than

another field which may perhaps produce a greater quantity, but which covers a longer and later fruiting period. In choosing a location for strawberries it is therefore extremely desirable that a piece of land be chosen which is warm and early, though well drained, yet not dry in nature, because the strawberry plant requires a good deal of moisture at fruiting time. Some growers continue the plantation for three years in the same place on account of the habit of the old plants ripening their fruit somewhat earlier than young plants. A difference of two or three days in time of ripening affects the financial result quite appreciably.

### SINGLE CROP SYSTEM.

In the leading strawberry growing sections of Ontario, the practice of taking only one crop of fruit from each planting is gaining in favour. The plants are set in the spring in rows four feet apart and 12 to 15 inches apart in the row. The ground is kept scrupulously clean and free from weeds by running the cultivator between the rows once a week or thereabouts, till the middle of August. The blossoms are removed as they appear and the runners are cut off untill cultivation ceases. By the end of the season, if a satisfactory growth has been made, the rows will have attained a width of about 18 inches. Strong growing varieties if allowed to run unchecked will exceed this width. Mulching the plants in the autumn with some protecting material is necessary to success in eastern Ontario and Quebec, particularly on soils liable to heave with the frost and in situations where the snow fall is light and the soil subject to frequent freezing and thawing in spring and fall. The plantation should always be mulched with straw during the picking season to ensure clean berries. In Prince Edward County, Ontario, a clover sod well worked down with a hoed crop and followed by a dressing of barn-yard manure is a favourite method of preparing for strawberries. When the crop of fruit is harvested the plants are turned under and the ground seeded to rye, or fall wheat with clover. Following a system of this kind a setting is made each spring. In order to provide himself with plants the grower keeps a more or less permanent bed in which the varieties he proposes to cultivate are grown in blocks by themselves. This insures plants true to name and enables him to make the proper mingling of bi-sexual, (staminate) and pistillate varieties. This system, while it appears rather prodigal in some respects, often saves much loss from the ravages of white grub and injury by leaf rust which are frequently most injurious the second year. The fruit is also larger and firmer on young plants, though slightly later than on two year olds. Yearling plants are also usually less injured by winter than two year olds.

### RENEWING OLD BEDS.

The amateur may find it convenient to renew his strawberry bed by the following method : As soon as the crop is gathered, remove the mulch which was placed between the rows during the picking season, dress the interspaces with well rotted manure, or wood ashes, using the latter at the rate of 100 bushels per acre. If the fertilizer is of the nature of stable manure it should be well worked into the soil, if wood ashes or a commercial fertilizer, cultivate, or rake in lightly ; then train the runners into these spaces. By the middle of September the young plants will have become firmly rooted. A line should then be stretched along each side of the row, separating the old plants from the new. With a spade or grass edging knife follow the line cutting the runners and then turn under the old plants with a spade, or if the plantation is large enough, a plough may be used. This plan will not work out successfully in the long run as the varieties become eventually much mixed, and the proportion of pistillates and staminates disarranged, by the stronger crowding out the weaker growing kinds.

STRAWBERRIES—Test of Varieties.

| Variety. | Year. | Sex. | When Planted. | Date of Blossoming. | Date of First Picking. | Date of Last Picking. | Length of Row. | Yield in Boxes. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ft. | |
| Auburn | 1894 | P. | Sp'ng 1893 | ... | June 25.. | July 11.. | 60 | 17 |
| do | 1895 | P. | do 1893 | May 30.. | do 20.. | do 2.. | 60 | 9 |
| do | 1896 | P. | do 1893 | do 25. | do 18.. | do 6.. | 60 | 3¾ |
| Anna Forest | 1896 | P. | do 1894 | do 25.. | do 20.. | do 6.. | 30 | 8 |
| Australian Everbearing | 1896 | B. | May 1895 | do 30.. | do 24.. | do 6.. | 30 | 2¼ |
| Albert | 1896 | P. | do 1895 | June 5.. | July 2.. | do 11.. | 30 | 2½ |
| Arrow | 1896 | P. | do 1895 | May 22.. | June 20.. | do 6.. | 30 | 4¾ |
| Ada | 1896 | P. | do 1895 | do 25.. | do 22.. | do 6.. | 30 | 4½ |
| Belmont | 1894 | B. | do 1893 | ... | do 25.. | do 11.. | 60 | 16¼ |
| do | 1895 | B. | do 1893 | May 29 | do 29.. | ... | 60 | 2¼ |
| do | 1896 | B. | do 1893 | do 31.. | do 24.. | July 2.. | 60 | 1½ |
| Black Giant | 1894 | B. | do 1893 | ... | do 25.. | do 3.. | 60 | 8 |
| do | 1895 | B. | do 1893 | May 28.. | do 29.. | ... | .... | 1 |
| do | 1896 | B. | do 1893 | do 25.. | ... | ... | ... | ... |
| Boynton | 1894 | P. | do 1893 | ... | June 22.. | July 11.. | 60 | 30¼ |
| do | 1895 | P. | do 1893 | May 25.. | do 18. | do 4.. | 60 | 38 |
| do | 1896 | P. | do 1893 | do 22.. | do 20.. | do 2.. | 60 | 8½ |
| Beder Wood | 1894 | B. | do 1893 | ... | do 23.. | do 11.. | 60 | 29½ |
| do | 1895 | B. | do 1893 | May 25.. | do 18.. | June 28.. | 60 | 8½ |
| do | 1896 | B. | do 1893 | do 23.. | do 13.. | July 11.. | 60 | 17¾ |
| Beverly | 1894 | B. | do 1893 | ... | do 25.. | do 11.. | 60 | 39½ |
| do | 1895 | B. | do 1893 | May 25.. | do 22.. | do 2.. | 60 | 9¼ |
| do | 1896 | B. | do 1893 | do 24. | do 20.. | do 6.. | 60 | 9¼ |
| Belt (Wm.) | 1896 | B. | do 1895 | do 24.. | do 20.. | do 16.. | 30 | 6 |
| Barton's | 1894 | P. | do 1893 | ... | do 25.. | do 11.. | 60 | 35½ |
| do | 1895 | P. | do 1893 | May 27.. | do 20. | do 9.. | 60 | 11 |
| do | 1896 | P. | do 1893 | do 25.. | do 20.. | do 11.. | 60 | 11¾ |
| Bubach | 1894 | B. | do 1893 | ... | do 22.. | do 11.. | 60 | 23½ |
| do | 1895 | B. | do 1893 | May 23.. | do 22.. | do 2.. | 60 | 3¼ |
| do | 1896 | B. | do 1893 | do 25.. | do 22.. | June 27.. | 60 | 2 |
| Beecher, H. W. | 1896 | B. | do 1895 | June 1.. | do 24.. | July 11.. | 30 | 7¾ |
| Brandywine | 1896 | B. | do 1895 | May 30.. | do 27.. | do 6.. | 30 | 1½ |
| Bissel | 1896 | P. | do 1895 | do 25.. | do 22.. | do 11.. | 30 | 9 |
| Buster, or No. 53 | 1896 | P. | do 1895 | do 31.. | do 24.. | do 11.. | 30 | 7¾ |
| Burnette | 1896 | B. | do 1895 | do 31.. | do 27.. | do 2.. | 30 | ½ |
| Barry | 1896 | .... | do 1895 | do 31.. | do 30.. | ... | 30 | ¼ |
| Bomba | 1896 | B. | do 1895 | do 23.. | do 20.. | July 2.. | 30 | 6½ |
| Belle | 1896 | B. | do 1893 | do 30. | do 24.. | do 11.. | 30 | 4¼ |
| Beebe | 1896 | .... | do 1895 | do 25.. | do 24.. | ... | 30 | 2 |
| Cohansick | 1894 | B. | do 1895 | ... | do 28.. | July 11.. | 60 | 11¾ |
| do | 1895 | B. | do 1893 | May 27.. | do 29.. | do 9.. | 60 | 7 |
| do | 1896 | B. | do 1893 | do 25.. | do 24.. | do 11.. | 60 | 1½ |
| Crescent | 1894 | P. | do 1893 | ... | do 22.. | do 11.. | 60 | 40 |
| do | 1895 | P. | do 1893 | May 25.. | do 20.. | do 9.. | 60 | 31½ |
| do | 1896 | P. | do 1893 | do 25.. | do 18.. | do 6.. | 60 | 18 |
| Cameronian | 1894 | B. | do 1893 | ... | do 25.. | do 11.. | 60 | 20 |
| do | 1895 | B. | do 1893 | May 27.. | do 29.. | ... | 60 | 1¼ |
| do | 1896 | B. | do 1893 | do 31.. | do 22.. | July 2.. | 60 | 2¾ |
| Captain Jack | 1894 | B. | do 1893 | ... | do 25.. | do 11.. | 60 | 17 |
| do | 1895 | B. | do 1893 | May 27.. | do 18.. | do 9.. | 60 | 17¼ |
| do | 1896 | B. | do 1893 | do 25.. | do 20.. | do 11.. | 60 | 9½ |
| Crawford | 1894 | B. | do 1893 | ... | do 25.. | do 5.. | 60 | 7 |
| do | 1895 | B. | do 1893 | May 29.. | do 28.. | ... | 60 | ½ |
| Chair's | 1895 | B. | do 1894 | ... | do 26.. | July 2.. | 30 | 3½ |
| do | 1896 | .... | ... 1894 | June 2.. | do 24.. | do 11.. | 30 | 2¾ |
| Charlie | 1895 | B. | Sept. 1894 | ... | do 20.. | do 4.. | 30 | 10¾ |
| Clark's Early | 1895 | B. | do 1894 | ... | do 24.. | do 26.. | 30 | ½ |
| do | 1896 | .... | ... | May 31.. | do 22.. | do 2.. | 30 | 2¾ |
| Charleston | 1896 | B. | Sp'ng 1895 | ... | do 22.. | do 11.. | 30 | 13¼ |
| Caughall Seedling | 1896 | P. | do 1895 | June 1.. | do 27.. | do 11.. | 30 | 4¼ |
| Child's First Season | 1896 | B. | do 1895 | do 5.. | do 22.. | do 6.. | 30 | 3½ |
| Cardinal | 1896 | B. | do 1895 | May 31.. | do 20.. | ... | 30 | 1 |
| Columbian | 1896 | B. | do 1895 | do 5.. | do 22. | July 6.. | 30 | 3¾ |
| Child's | 1896 | P. | do 1895 | do 25. | do 22.. | do 6.. | 30 | 1¾ |
| Daisy | 1894 | P. | do 1893 | ... | do 25.. | do 11.. | 60 | 16½ |

## Strawberries—Test of Varieties.

| Variety. | Year. | Sex. | When Planted. | Date of Blossoming. | Date of First Picking. | Date of Last Picking. | Length of Row. | Yield in Boxes. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ft. | |
| Daisy | 1895 | P. | Sp'ng 1893 | May 29.. | June 20.. | July 2.. | 60 | 9 |
| do | 1896 | P. | do 1893 | do 25.. | do 20.. | June 30.. | 60 | 9¾ |
| Dayton | 1894 | B. | do 1893 | ...... ... | do 23.. | July 5.. | 60 | 16½ |
| do | 1895 | B. | do 1893 | May 27.. | do 26.. | .......... | 60 | 3 |
| do | 1896 | B. | do 1893 | do 25.. | do 20.. | June 30.. | 60 | 7¼ |
| Daniel Boone | 1894 | P. | do 1893 | .......... | do 25.. | July 5.. | 60 | 15½ |
| do | 1895 | P. | do 1893 | ....... | do 20.. | do 2.. | 60 | 5¼ |
| do | 1896 | P. | do 1893 | May 30.. | do 24.. | do 11.. | 60 | 1¾ |
| Dew | 1895 | B. | do 1894 | .......... | July 9.. | ......... | 30 | ¼ |
| do | 1896 | .... | do 1894 | May 27.. | June 24.. | July 6.. | 30 | 2¼ |
| Dora | 1896 | P. | do 1894 | do 29.. | do 20.. | do 6.. | 30 | 10½ |
| Eureka | 1894 | P. | do 1894 | .......... | do 25.. | June 30.. | 60 | 2¼ |
| Early Canada | 1894 | B. | do 1893 | .... ..... | do 22.. | July 5.. | 60 | 11¾ |
| do | 1895 | B. | do 1893 | May 23.. | do 26 . | .......... | 60 | ½ |
| do | 1896 | B. | do 1893 | do 24.. | do 22.. | .......... | 60 | ¼ |
| Edward's Favourite | 1895 | B. | do 1894 | ..... .... | do 26.. | July 9.. | 30 | 1¾ |
| do | 1896 | .... | do 1894 | June 1.. | do 27.. | do 11.. | 30 | 1½ |
| Equinox | 1896 | B. | do 1894 | May 31.. | do 17.. | do 11.. | 30 | 1½ |
| E. P. Roe | 1886 | B. | do 1895 | do 25.. | do 30.. | do 11.. | 30 | ¼ |
| Enhance | 1896 | B. | do 1895 | do 27.. | do 24.. | do 11.. | 30 | 6½ |
| Enormous | 1896 | P. | do 1895 | June 1.. | do 22.. | do 6.. | 30 | 6¼ |
| Empress of India | 1896 | P. | do 1895 | May 31.. | ......... | do 6. | 30 | 2 |
| Epping | 1896 | P. | do 1895 | do 31.. | June 20.. | do 6.. | 30 | 4½ |
| Eleanor | 1896 | P. | do 1895 | do 31.. | do 24.. | .......... | 30 | ¼ |
| Gandy | 1894 | B. | do 1893 | .......... | do 28.. | July 11.. | 60 | 9¾ |
| do | 1895 | B. | do 1893 | June 1.. | do 22.. | do 9.. | 60 | 9¼ |
| do | 1896 | B. | do 1893 | May 31.. | do 24.. | do 11.. | 60 | 13 |
| Green Prolific | 1894 | P. | do 1893 | ......... | do 25.. | do 11.. | 60 | 15 |
| do | 1895 | P. | do 1893 | May 28.. | do 18.. | June 29.. | 60 | 7½ |
| do | 1896 | B. | do 1893 | do 25.. | do 20.. | July 6.. | 60 | 8½ |
| Gunton Park | 1896 | B. | do 1895 | do 31.. | .... ..... | .... .. .. | 30 | |
| Garibaldi | 1894 | P. | do 1893 | ..... ... | June 28.. | July 11.. | 60 | 7¾ |
| do | 1895 | P. | do 1893 | June 1.. | do 29.. | do 2.. | 60 | 4½ |
| do | 1896 | P. | do 1893 | May 25.. | do 27.. | do 11.. | 60 | 4 |
| General Putman | 1896 | B. | do 1895 | do 22.. | do 22.. | do 22.. | 30 | 8 |
| Governor Hoard | 1895 | B. | do 1894 | .... ..... | do 25.. | do 11.. | 30 | 8½ |
| do | 1896 | B. | do 1894 | .......... | do 18.. | do 6.. | 60 | 2¾ |
| Gertrude | 1896 | .... | .... .... | May 23.. | do 29.. | do 6.. | 30 | 3½ |
| Gillespie | 1895 | B. | do 1894 | ......... | do 25.. | do 5.. | 30 | 1½ |
| do | 1896 | B. | .......... | .......... | do 22.. | June 24.. | 30 | 2¼ |
| Gardner | 1896 | B. | do 1895 | May 22.. | do 20.. | July 6.. | 30 | 5¾ |
| Gem | 1896 | P. | do 1895 | June 1.. | do 22.. | do 6.. | 30 | 3¼ |
| Greenville | 1896 | P. | do 1895 | .......... | do 22.. | do 11.. | 30 | 9 |
| Giant | 1896 | .... | do 1895 | May 4.. | do 30.. | do 11.. | 30 | 2¾ |
| Hoffman's Seedling | 1894 | B. | do 1895 | .......... | do 25.. | do 11.. | 60 | 11¾ |
| do | 1895 | B. | do 1895 | May 27.. | do 29.. | ........ | 60 | ¼ |
| do | 1896 | B. | do 1895 | do 24.. | do 20.. | June 30.. | 60 | 3½ |
| Haverland | 1894 | B. | do 1895 | .... .... | do 22.. | July 11.. | 60 | 27 |
| do | 1895 | B. | do 1895 | May 25.. | do 20.. | do 9.. | 60 | 5¾ |
| do | 1896 | B. | do 1895 | do 24.. | do 22.. | do 11.. | 60 | 8¼ |
| Hope, or 53 H | 1896 | B. | .......... | do 27.. | do 22.. | do 2.. | 30 | 4¼ |
| Hale, B.I.C | 1896 | P. | .......... | do 31.. | do 27.. | do 2.. | 30 | 1¼ |
| Itasca | 1894 | B. | do 1893 | .... .. .. | do 30.. | do 11.. | 60 | 24¼ |
| do | 1895 | B. | do 1893 | May 29.. | do 26.. | do 4.. | 60 | 5¾ |
| do | 1896 | B. | do 1893 | do 31.. | do 24.. | .......... | 60 | 2 |
| Iowa Beauty | 1894 | B. | do 1893 | .... ..... | do 25.. | July 11.. | 60 | 11½ |
| do | 1895 | B. | do 1893 | May 20.. | do 26.. | do 9.. | 60 | 2½ |
| do | 1896 | B. | do 1893 | do 24.. | do 20.. | do 2.. | 60 | 3¼ |
| Ivanhoe | 1896 | P. | do 1895 | do 31.. | do 22.. | do 2.. | 30 | 4 |
| John Little | 1894 | B. | do 1893 | ........ . | do 25.. | do 11.. | 60 | 35 |
| do | 1895 | B. | do 1893 | May 25. | do 18.. | do 9.. | 60 | 22 |
| do | 1896 | B. | do 1893 | do 25.. | do 22.. | do 2.. | 60 | 4 |
| James Vick | 1894 | B. | do 1893 | .... ..... | do 25.. | do 11.. | 60 | 38¾ |
| do | 1895 | B. | do 1893 | May 28.. | do 20.. | do 9.. | 60 | |
| do | 1896 | B. | do 1893 | do 25.. | do 24.. | do 11.. | 60 | 6¾ |

STRAWBERRIES.—Test of Varieties.

| Variety. | Year. | Sex. | When Planted. | Date of Blossoming. | Date of First Picking. | Date of Last Picking. | Length of Row. | Yield in Boxes. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ft. | |
| Jay Gould | 1886 | P. | Sp'ng 1895 | May 31 | June 22 | June 27 | .... | ¾ |
| King of the North | 1894 | B. | do 1893 | ........ | do 25 | July 11 | 60 | 9¼ |
| do | 1895 | B. | do 1893 | May 25 | do 26 | ........ | 60 | 2¼ |
| Kentucky | 1896 | B. | do 1895 | June 1 | do 24 | July 11 | 30 | 3 |
| Klickita | 1896 | P. | do 1895 | May 24 | do 22 | do 6 | 30 | 5¾ |
| Logan | 1894 | B. | do 1893 | ........ | do 25 | do 11 | 60 | 14 |
| do | 1895 | B. | do 1893 | May 28 | do 29 | ........ | 60 | ¼ |
| do | 1896 | B. | do 1893 | do 29 | do 20 | July 6 | 60 | 2½ |
| Leader | 1894 | B. | do 1893 | ........ | do 25 | do 3 | 60 | 1 |
| do | 1895 | B. | do 1893 | May 27 | do 20 | do 2 | 60 | 2½ |
| do | 1896 | B. | do 1893 | do 25 | do 20 | do 6 | 60 | 3¼ |
| Lord Suffield | 1896 | B. | do 1895 | ........ | do 24 | do 2 | 30 | 2⅓ |
| Lovett | 1896 | B. | do 1895 | May 31 | do 24 | do 11 | 30 | 3¾ |
| Laxton's No. 1 | 1896 | B. | do 1895 | do 27 | do 30 | ........ | 30 | ¼ |
| Moore's Prolific | 1894 | B. | do 1893 | ........ | do 25 | July 11 | 60 | 2¼ |
| do | 1896 | B. | ........ | May 31 | do 22 | June 27 | 30 | ¾ |
| Mammoth | 1894 | B. | do 1893 | ........ | do 25 | July 11 | 60 | 6¼ |
| do | 1895 | B. | do 1893 | May 27 | do 26 | June 29 | 60 | ¾ |
| do | 1896 | B. | do 1893 | do 30 | do 27 | ........ | 60 | ¼ |
| Miller's Seedling, O. 2 | 1894 | B. | do 1893 | ........ | do 22 | July 5 | 60 | 16½ |
| do | 1895 | B. | do 1893 | May 27 | do 26 | do 2 | 60 | 2¾ |
| do | 1896 | B. | do 1893 | do 31 | do 24 | June 30 | 60 | ½ |
| Moline or Stone's No. 65 | 1896 | P. | do 1895 | do 25 | do 20 | July 6 | 30 | 6¾ |
| Miller's Seedling H. 11 | 1894 | P. | do 1893 | do 30 | do 25 | do 11 | 60 | 14¾ |
| do | 1895 | P. | do 1893 | do 20 | do 22 | do 2 | 60 | 8 |
| Mrs. Cleveland | 1894 | P. | do 1893 | ........ | do 23 | do 11 | 60 | 17½ |
| do | 1895 | P. | do 1893 | May 27 | do 20 | do 4 | 60 | 10½ |
| do | 1896 | P. | do 1893 | do 24 | do 16 | do 11 | 60 | 6¼ |
| Middlefield | 1894 | P. | do 1893 | do 24 | do 28 | do 11 | 60 | 9¾ |
| do | 1896 | P. | do 1893 | do 25 | do 27 | do 6 | 60 | ¾ |
| Martha | 1894 | P. | do 1893 | ........ | do 25 | do 11 | 60 | 34½ |
| do | 1895 | P. | do 1893 | do 27 | do 22 | do 2 | 60 | 10¼ |
| do | 1896 | P. | do 1893 | do 23 | do 20 | do 2 | 60 | 11 |
| Mincola | 1896 | P. | do 1895 | June 2 | do 24 | do 6 | 30 | 2¼ |
| Mary | 1896 | P. | do 1895 | do 3 | ........ | do 6 | 30 | ¼ |
| Margaret | 1896 | B. | do 1895 | May 25 | June 22 | do 6 | 30 | 4 |
| Maple Bank | 1896 | P. | do 1895 | do 31 | do 22 | do 6 | 30 | 1¾ |
| Monarch of the West | 1896 | B. | do 1895 | do 25 | do 22 | do 6 | 30 | 2¼ |
| Marshall | 1896 | B. | do 1895 | do 31 | do 30 | do 6 | 30 | 2¼ |
| Nicanor | 1894 | B. | do 1893 | ........ | do 22 | do 5 | 60 | 9 |
| do | 1895 | B. | do 1893 | May 20 | do 29 | do 2 | 60 | 1¼ |
| do | 1896 | B. | do 1893 | do 19 | do 24 | ........ | 60 | ½ |
| Norman | 1894 | B. | do 1893 | ........ | do 25 | July 5 | 60 | 9½ |
| do | 1895 | B. | do 1893 | May 25 | do 24 | do 4 | 60 | 3½ |
| New Dominion | 1894 | B. | do 1893 | ........ | do 25 | do 11 | 60 | 30 |
| do | 1895 | B. | do 1893 | May 25 | do 22 | do 9 | 60 | 19¼ |
| do | 1896 | B. | do 1893 | do 24 | do 22 | do 2 | 60 | 1¾ |
| Noble | 1896 | B. | do 1895 | do 29 | do 22 | June 30 | 30 | 1½ |
| Osceola | 1894 | B. | do 1893 | ........ | do 22 | do 30 | 60 | 13½ |
| do | 1895 | B. | do 1893 | May 25 | do 18 | do 26 | 60 | 2¼ |
| do | 1896 | B. | do 1893 | do 29 | do 22 | ........ | 60 | ¼ |
| Orange County | 1896 | P. | do 1895 | ........ | do 20 | July 6 | 30 | 6 |
| Ostego | 1896 | P. | do 1895 | May 29 | do 27 | do 11 | 30 | 6½ |
| Oregon Everbearing | 1896 | B. | do 1895 | do 25 | do 22 | ........ | 30 | ¼ |
| Pearl | 1894 | B. | do 1893 | ........ | do 22 | July 11 | 60 | 26¼ |
| do | 1895 | B. | do 1893 | May 25 | do 18 | do 2 | 60 | 12½ |
| do | 1896 | B. | do 1893 | do 28 | do 20 | do 6 | 60 | 7¼ |
| Pine Apple | 1894 | B. | do 1893 | ........ | do 23 | do 11 | 60 | 19¼ |
| do | 1895 | B. | do 1893 | May 27 | do 20 | do 9 | 60 | 5 |
| do | 1896 | B. | do 1893 | do 25 | do 16 | do 11 | 60 | 6¼ |
| Prince of Berries | 1894 | B. | do 1893 | ........ | do 30 | do 11 | 60 | 16 |
| do | 1895 | B. | do 1893 | June 1 | July 2 | ........ | 60 | ¾ |
| do | 1896 | B. | do 1893 | do 2 | June 30 | July 11 | 60 | 1¾ |
| Parker Earle | 1894 | B. | do 1893 | ........ | do 25 | do 11 | 60 | 24¼ |
| do | 1895 | B. | do 1893 | May 25 | do 22 | do 9 | 60 | 21¼ |

STRAWBERRIES—Test of Varieties.

| Variety. | Year. | Sex. | When Planted. | | Date of Blossoming. | Date of First Picking. | Date of Last Picking. | Length of Row. | Yield in Boxes. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Ft. | |
| Parker Earle | 1896 | B. | Sp'ng | 1893 | May 25.. | June 22.. | July 11.. | 60 | 15 |
| Princess | 1894 | P. | do | 1893 | .......... | do 25.. | do 11.. | 60 | 16¾ |
| do | 1895 | P. | do | 1893 | May 27.. | do 24.. | June 29.. | 60 | 4½ |
| do | 1896 | P. | do | 1893 | do 25.. | do 18.. | July 2.. | 60 | 5¼ |
| Paris King | 1896 | B. | do | 1895 | do 30.. | do 20.. | do 11.. | 30 | 4¼ |
| Plow City | 1896 | B. | do | 1895 | do 31.. | do 30.. | do 11.. | 30 | 1 |
| Phillip's Seedling | 1896 | B. | do | 1895 | do 25.. | do 20.. | do 6.. | 30 | 7½ |
| Ruby | 1894 | B. | do | 1893 | ......... | ..... | .......... | 30 | .... |
| Rio | 1895 | B. | do | 1894 | .......... | June 18.. | July 9.. | 30 | 2¼ |
| do | 1896 | .... | do | 1894 | May 24.. | do 22.. | do 6.. | 30 | 7¼ |
| Robinson | 1895 | B. | do | 1894 | .... .... | do 18.. | do 9.. | 30 | 6¼ |
| do | 1896 | ... | do | 1894 | do 25.. | do 20.. | do 11.. | 30 | 7¼ |
| Stayman's No. 1 | 1894 | P. | do | 1893 | .... . .. | do 22.. | do 11.. | 60 | 37½ |
| do | 1895 | P. | do | 1893 | May 27.. | do 18.. | do 9.. | 60 | 20¼ |
| do | 1896 | P. | do | 1893 | do 25.. | do 20.. | do 11.. | 60 | 10 |
| Seneca Queen | 1894 | B. | do | 1893 | ......... | do 22.. | do 5.. | 60 | 36½ |
| do | 1895 | B. | do | 1893 | May 25.. | do 18.. | do 9.. | 60 | 6 |
| do | 1896 | B. | do | 1893 | do 24.. | do 22.. | do 6.. | 60 | 1¾ |
| Shirts | 1894 | B. | do | 1893 | .......... | do 25.. | do 11.. | 60 | 7 |
| do | 1895 | B. | do | 1893 | May 29.. | do 26.. | do 2.. | 60 | 4¼ |
| do | 1896 | B. | do | 1893 | do 31.. | do 24.. | do 11.. | 60 | 5 |
| Standard | 1894 | B. | do | 1893 | .......... | do 22.. | do 11.. | 60 | 11¼ |
| do | 1895 | B. | do | 1893 | May 28.. | do 20.. | do 9.. | 60 | 14¾ |
| do | 1896 | B. | do | 1893 | do 25.. | do 16.. | do 2.. | 60 | 4¾ |
| Sharpless | 1894 | B. | do | 1893 | .......... | do 22.. | do 11.. | 60 | 9½ |
| do | 1895 | B. | do | 1893 | May 27.. | do 20.. | do 9.. | 60 | 5¾ |
| do | 1896 | B. | do | 1893 | do 31.. | do 22.. | do 6.. | 60 | 2½ |
| Shuckless | 1894 | B. | do | 1893 | .......... | do 30.. | .... .... | 60 | ¼ |
| do | 1895 | B. | do | 1893 | May 30.. | do 24.. | July 2.. | 30 | 2½ |
| do | 1896 | B. | do | 1893 | do 25.. | do 30.. | do 6.. | 30 | 2¼ |
| Shuster's Gem | 1896 | P. | do | 1895 | .......... | do 20.. | do 11.. | 30 | 6¼ |
| Swindle | 1895 | B. | Sept. | 1894 | .... .... | do 22.. | do 9.. | 30 | 5¾ |
| do | 1896 | B. | Sp'ng | 1894 | May 24.. | do 22.. | do 11.. | 30 | 9¼ |
| Sandoval | 1895 | B. | do | 1894 | ......... | do 26.. | do 4.. | 30 | 2¾ |
| do | 1896 | B. | do | 1894 | May 25.. | do 27.. | do 11.. | 30 | 2¾ |
| Surprise | 1895 | B. | do | 1894 | do 27.. | do 22 . | do 4.. | 60 | 12½ |
| do | 1896 | B. | do | 1884 | do 28.. | do 24.. | do 11.. | 60 | 5¼ |
| Staples | 1896 | B. | do | 1895 | .......... | do 20.. | do 2.. | 60 | 4¼ |
| Sunrise | 1896 | P. | do | 1895 | May 31.. | do 22.. | do 2.. | 30 | 4¾ |
| Smith's Seedling | 1896 | B. | do | 1895 | do 24.. | do 18.. | do 6.. | 30 | 9½ |
| Scarlet Queen. | 1896 | P. | do | 1895 | June 2.. | .......... | ......... | 30 | .... |
| do Ball. | 1896 | P. | do | 1895 | .... ... | June 30.. | July 17.. | 30 | 7½ |
| Sensation | 1896 | B. | do | 1895 | May 30.. | do 30.. | .......... | 30 | ¼ |
| Turner's Beauty | 1894 | B. | do | 1893 | .......... | do 22.. | July 3.. | 60 | 9¼ |
| do | 1895 | B. | do | 1893 | May 27.. | do 20.. | June 29.. | 60 | 1¼ |
| do | 1896 | B. | do | 1893 | do 24.. | do 20.. | July 11.. | 60 | 3½ |
| Tennessee Prolific | 1895 | B. | do | 1894 | do 24.. | do 18.. | do 9.. | 30 | 7½ |
| do | 1896 | .... | do | 1894 | do 24.. | do 22.. | do 6.. | 30 | 6¾ |
| Thompson's Late, 66 | 1895 | P. | do | 1894 | do 31.. | do 20.. | do 9.. | 30 | 7¼ |
| do | 1896 | P. | do | 1894 | do 31.. | do 27.. | do 11.. | 30 | 10¾ |
| Teutonia | 1896 | B. | do | 1895 | do 31.. | .......... | do 6.. | 30 | 2 |
| Van Deman | 1894 | B. | do | 1893 | ........ | June 22.. | do 11.. | 60 | 35¼ |
| do | 1895 | B. | do | 1893 | May 25.. | do 20.. | do 9.. | 60 | 8¼ |
| do | 1896 | B. | do | 1893 | do 22.. | do 18.. | do 11.. | 60 | 9¼ |
| Victor Hugo | 1896 | B. | do | 1895 | do 25.. | do 24.. | do 2.. | 30 | 1¼ |
| Warfield No. 2 | 1894 | P. | do | 1893 | .... .... | do 22.. | do 11.. | 60 | 37½ |
| do | 1895 | P. | do | 1893 | May 29.. | do 18.. | do 4 . | 60 | 23¼ |
| do | 1896 | P. | do | 1893 | do 26.. | do 18.. | do 11.. | 60 | 17¼ |
| Windsor Chief | 1894 | P. | do | 1893 | .... .... | do 25.. | do 11.. | 60 | 25½ |
| do | 1895 | P. | do | 1893 | May 27.. | do 18.. | do 9.. | 60 | 33½ |
| do | 1896 | P. | do | 1893 | do 25.. | do 20.. | do 17.. | 60 | 13¼ |
| Wonderful | 1894 | P. | do | 1893 | .... . | do 22.. | do 11.. | 60 | 22¼ |
| do | 1895 | P. | do | 1893 | May 27.. | do 18.. | do 9.. | 60 | 15¾ |
| do | 1896 | P. | do | 1893 | do 30.. | do 24.. | June 30. | 60 | 2¾ |
| West Brook | 1894 | P. | do | 1893 | .......... | do 22.. | July 5.. | 60 | 12¾ |

## STRAWBERRIES—Test of Varieties.

| Variety. | Year. | Sex. | When Planted. | Date of Blossoming. | Date of First Picking. | Date of Last Picking. | Length of Row. | Yield in Boxes. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ft. | |
| West Brook | 1895 | P. | Sp'ng 1893 | May 27.. | June 18.. | July 9.. | 60 | $4\frac{3}{4}$ |
| Westlawn | 1894 | P. | do 1893 | .... ... | do 22.. | do 5.. | 60 | $9\frac{3}{4}$ |
| do | 1895 | P. | do 1893 | May 29.. | do 20.. | do 2.. | 60 | $13\frac{3}{4}$ |
| do | 1896 | P. | do 1893 | do 25.. | do 20.. | do 11.. | 60 | $12\frac{1}{4}$ |
| Weston | 1896 | P. | do 1895 | .... .... | do 24.. | do 11.. | 30 | 3 |
| Williams | 1894 | B. | do 1893 | ........ | do 22.. | do 11.. | 60 | $31\frac{3}{4}$ |
| do | 1895 | B. | do 1893 | May 29.. | do 22.. | do 9.. | 60 | $17\frac{1}{2}$ |
| do | 1896 | B. | do 1893 | do 31.. | do 22.. | do 11.. | 60 | $8\frac{1}{4}$ |
| Wilson | 1894 | B. | do 1893 | ........ | do 22.. | do 5.. | 60 | $26\frac{1}{2}$ |
| do | 1895 | B. | do 1893 | May 27.. | do 18.. | do 9.. | 60 | 17 |
| do | 1896 | B. | do 1893 | do 25.. | do 20.. | do 6.. | 60 | $5\frac{1}{2}$ |
| Woolverton | 1894 | B. | do 1893 | ........ | do 25.. | do 5.. | 60 | $8\frac{1}{2}$ |
| do | 1895 | B. | do 1893 | June 4.. | do 26.. | June 29.. | 60 | $3\frac{1}{4}$ |
| do | 1896 | B. | do 1893 | May 25.. | do 24.. | do 30.. | 60 | $1\frac{1}{2}$ |
| Yale | 1894 | B. | do 1893 | ..... .. | do 30.. | July 11.. | 60 | 6 |
| do | 1895 | B. | do 1893 | May 29.. | do 24.. | do 9. | 60 | $5\frac{3}{4}$ |
| do | 1896 | B. | do 1893 | do 31.. | do 27.. | do 6.. | 60 | 2 |
| Young's Seedling | 1896 | B. | do 1895 | do 25.. | do 24.. | do 11.. | .... | $2\frac{3}{4}$ |
| 1001 | 1894 | B. | do 1893 | .... ..... | do 25.. | do 11.. | 60 | 23 |
| do | 1895 | B. | do 1893 | May 27.. | do 22.. | do 4.. | 60 | $11\frac{1}{2}$ |
| do | 1896 | B. | do 1893 | do 24.. | do 20.. | do 11.. | 60 | $3\frac{1}{2}$ |

### PRODUCTIVE VARIETIES.

The following varieties are among the most productive of those which have been under test for five or more years. The best of these are marked thus *

#### PISTILLATE.

*Crescent,
Bartons,
*Boynton,
*Bubach,
*Haverland,
Martha,
Seneca Queen,
Staymans No. 1,
*Warfield,
Windsor Chief,

#### BI-SEXUAL, (PERFECT.)

*Beder Wood,
Beverley,
Jas. Vick,
*New Dominion,
*Parker Earle,
Van Deman,
*Williams.

#### EARLY VARIETIES.

Beder Wood, B.
Boynton, P.
Crescent, P.
Leader, B.
Miss Cleveland, P.
Pearl, P.
Scarlet Ball, B.
Wilson, B.
Warfield, P.

#### LATE VARIETIES.

Haverland, B.
Martha, P.
Parker Earle, B.
New Dominion, B.
Seneca Queen, B.
Sharpless, B.
Shuckless, B.
Williams, B.

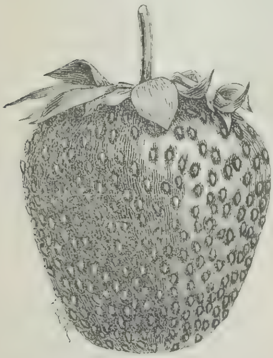
Fifteen months after planting.  Photographed, July 4th.

Thompson's Late.

In setting a plantation some attention should be given to arranging or mating the varieties so that those which bloom at or about the same time are planted in adjoining rows. Pistillate varieties as a rule are more productive than the perfect flowered kinds. By glancing at the above selections a suitable arrangement may be effected.

Among those on trial since the spring of 1895, the following by reason of productiveness, quality and vigour of plant appear worthy of trial :—

| PISTILLATE. | BI-SEXUAL, (PERFECT.) |
|---|---|
| Bissel, | Belt (Wm.) |
| Greenville, | Marshall, |
| Thompson's Late, | Tennessee Prolific, |
| Buster, | Charlie. |
| Scarlet Ball, | |


Pearl.

VARIETIES FOR THE HOME GARDEN.

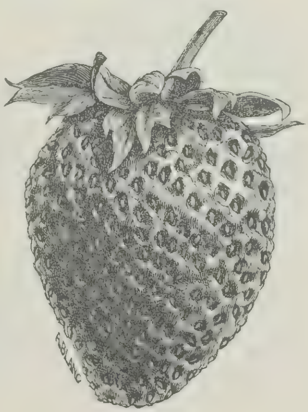
In selecting for home use vigour of plant and quality of fruit should be the chief essential to keep in mind. The following appear as tested here to be specially valuable from the amateur standpoint :—

| | |
|---|---|
| Pearl, | Bubach, |
| Martha, | Belle, |
| Prince of Berries, | Brandywine, |
| Greenville, | Beverly. |
| Timbrell, | |

COMMERCIAL VARIETIES OLD AND NEW.

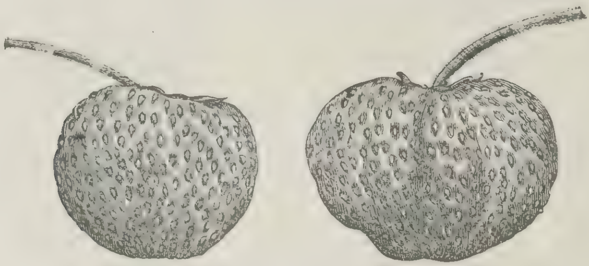
To comply with the demands of the commercial grower, a variety must be a good grower, be productive and produce fruit firm enough to bear transportation well.

Haverland and Warfield with Crescent and Wilson are probably the most popular varieties at the present time. Parker Earle, Gandy, and Williams are favourite late varieties. Beder Wood is rather soft and light in colour, though possessing many other valuable qualities. Williams is prized in southern Ontario, but is often "white tipped." Michel (Michel's early) has proved almost barren on sandy soil. After a trial extending over three years, with plants received from different sources, I have been forced to pronounce it worthless in this locality.


Haverland.

BRIEF NOTES OF SOME LEADING VARIETIES.

Beder Wood B.—This is valuable as a pollenizer. It is early and pro ductive, but the berries are scarcely firm enough to stand shipment well Fair, in size and quality.



Beder Wood.

Beverly, B.—A strong grower with light coloured foliage. Fruit stalks long and stout. Berry, medium to large, roundish conical, light red, seeds deeply set, rather soft, quality good. An amateur variety.

Boynton, P.—Received from M. Crawford, Cuyahoga, Ohio. Planted spring of 1892. It proved a poor grower the first year. The next season it grew much more vigorously and showed a greater disposition to form runners. Fruit medium size, conical, crimson, firm, fair quality; sometimes it has a hard core. The following year and since that time it has been a productive variety, but not an ideal market berry, being rather small and not very attractive.

Bubach.

Bubach, P.—This is essentially an amateur variety. The berry is large, moderately firm, is handsome and of fair quality. The blossoms usually have a number of stamens. The plant does not make runners freely. It succeeds well in the "Hill" system.

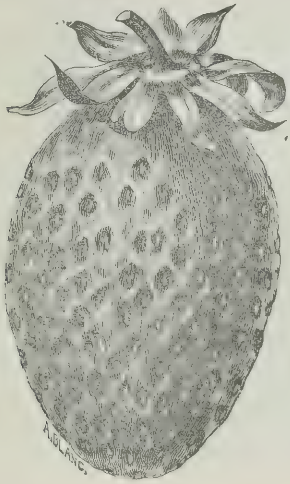
Crawford.—Has been highly spoken of, but here it has been soft in texture and unproductive, though excellent in quality.

Gandy, B.—Blossoms and fruits late, but like most of this class is unproductive.

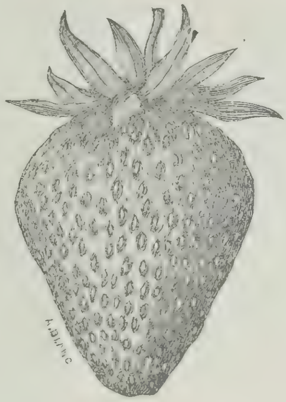
Martha, P.—A fair to strong grower, berries medium, conical, dark crimson, moderately firm, fair quality, season medium to late. Fruit stalks are slender and drooping, necessitating careful mulching.

Middlefield, P.—This is of the New Dominion type of berry. The foliage is healthy and it is a fair grower. Berry roundish conical, bright glossy red with prominent light coloured seeds, quality good, mid-season or late.

PARKER EARLE, B.—This is undoubtedly a valuable berry. The plant is vigorous, almost too much so, late, of good quality, and productive. It is liable to become very rusty late in the summer and should be sprayed with Bordeaux mixture.



Parker Earle.



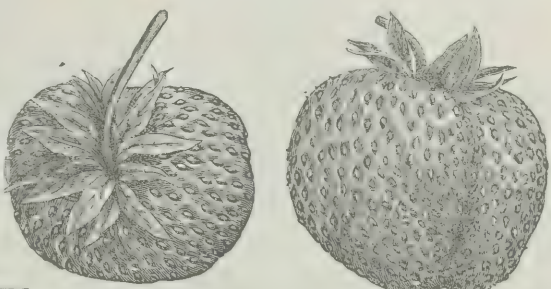
Warfield.

STAYMAN'S NO. 1, P.—Although reported as worthless by some stations, here it has done well as regards yield of fruit and health of plant. Berry medium sized, bright red, firm, quality fair to good.

VAN DEMAN, B.—This has been widely advertised as an extremely productive and valuable variety. It has not borne out its good reputation here, except as to productiveness. The berry is medium to small, very soft and of poor quality.

WARFIELD, P.—A vigorous grower and a healthy plant. Berry conical, dark crimson, medium size, acid and firm. A good point about this variety is that the last pickings are nearly as good as the first in regard to the size of the berries.

WILLIAMS, B.—Foliage heavy dark coloured, a strong grower. Berries large, conical, dark red, sometimes irregular wedge shaped, firm, of fair quality. In certain localities growers complain that this variety has a hard core and a "white tip."



Williams.

WOOLVERTON, B.—This has the same type of foliage as Bubach and like that variety produces few runners. Berry large, firm, quality good. Fruit stalks short, necessitating careful mulching to prevent the berries from becoming "sanded." This variety was killed very generally in the Ottawa valley last winter.

Woolverton.

Among varieties of more recent introduction, the following appear to be the best as tested here :—

Bissel, P.—Plant vigorous. Berry large, sharply conical, dark red, fairly firm; quality not above medium. This should be carefully tested by commercial growers.

Buster, P.—Also a vigorous grower. Berry large, conical, light red, moderately firm, rather acid in character. Season, medium to late. Fruited 1896-97.

Belt (Wm.), B.—Plant vigorous and healthy. Picking season extends over a long period. Berry medium size, conical, bright crimson, firm, fair quality. Appears to be worthy of trial for commercial purposes.

Brandywine, B.—Only a fair grower. Berry large, roundish, dark crimson, firm, good quality. This is a distinct acquisition as to quality. Further trial is needed to determine its productiveness.

Charlie, P.—A strong grower, with healthy foliage. Fruit stalks long. Berry medium size, conical, bright scarlet, moderately firm, fair quality.

Clark's Early, B.—Fair grower; good foliage. Berry large, oblate, dark red, glossy, firm, good quality. This at first gave every indication of productiveness, but failed late in the season.

Greenville, P.—A strong grower. Berry medium size, round, crimson, attractive; good quality, but soft. It has not been productive.

Robinson, B.—Vigorous. Berry medium size, conical, dark red, moderately firm. Rather acid in quality; produces an abundance of pollen.

Rio, B.—Foliage healthy. Berries large, light red, part from the calyx readily; quality good. Home use.

Scarlet Ball, B.—A particularly strong grower, with long leaf and fruit stalks. Thus far it has not been affected by rust or mildew. Berry large, round, light red, firm, good quality, sometimes unevenly coloured. Apparently a worthy late variety.

Tennessee Prolific, B.—A strong healthy grower. Berry medium size, conical, bright glossy red, firm, fair quality. Of considerable merit for market purposes.

Thompson's Late, P.—A good grower. Berries, small, conical, firm, fair quality. This should be thoroughly tested in a commercial way, giving it rich soil and good cultivation.

Timbrell has been much advertised; unfortunately the plants set out three years ago, owing to an accident, did not fruit the following season. Last year the crop was small in the aggregate although a few plants gave evidence of great productiveness. The berries ripen unevenly, and while firm-fleshed and of fine quality, are very unattractive in colour. It would seem to be worthy of a place in the amateur's garden, but does not commend itself to the commercial grower.

## DISEASES.

### *LEAF BLIGHT : RUST. (*Sphaerella Fragariae.*, Sacc.)

The round purplish or reddish-brown spots which appear on the leaves of strawberry plants during the growing season and in greatest abundance just after midsummer, are the evidence of the presence of the above injurious fungous disease. The spots, at first small and few in number, increase in size till the entire leaf is involved, and the foliage shows the effect of the parasite's presence by shrivelling and withering. This loss of foliage is a very serious matter, often coming early enough to materially lessen the crop, and taking place at a time when the plant should be making new runners for the next year. The fungus is carried over winter by means of spores and by means of mycelium (representing the vegetative portion of the parasite) contained within the leaves. Some varieties are affected much more than others. It has been generally noted that strawberries are affected to a greater extent on sandy soil than on clay loam.

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*I am kindly allowed to use the two following cuts by Messrs. Macmillan & Co., of New York, publishers of the Spraying Book.

Bissel.

Belt (Wm.).

TREATMENT :—Bordeaux mixture prevents this disease, and on plantations where the single crop system is followed this is the most practical and effective remedy. When two crops are taken from the plantation, mowing and burning the leaves on the rows immediately after the season of berry picking closes, is the practice in some localities. In order to test the value of this practice, some experiments were tried in 1894. In a plot where the varieties were planted in double parallel rows, the foliage on one row was

Leaf Rust.

mowed and burnt, as is often recommended, without removing it from the plants. The other row was not touched. When there was an extra amount of litter lying on the rows the crowns of the plants were somewhat injured by the burning; this had the effect of thinning them more than was desirable. The succeeding growth of the plants in the burnt rows was at first luxuriant and healthy, but rust soon appeared and made rapid headway; these plants were, however, in a decidedly healthier condition at the close of the season than those in the adjoining rows, as may be seen by the following tabular statement:

| Variety. | Leaf Rust on Foliage Burnt, Scale, 1-10. | Leaf Rust on Foliage not Burnt, Scale, 1-10. | Variety. | Leaf Rust on Foliage Burnt, Scale, 1-10. | Leaf Rust on Foliage not Burnt, Scale, 1-10. |
|---|---|---|---|---|---|
| Belmont ....... | 8 | 5 | Middlefield...... | 8 | 6 |
| Black Giant..... | 6 | 4 | Martha.......... | 6 | 4 |
| Boynton......... | 9 | 7 | New Dominion.. | 6 | 4 |
| Beder Wood .... | 6 | 4 | Osceola......... | 9 | 8 |
| Beverly......... | 8 | 4 | Pearl ........... | 7 | 5 |
| Barton's ........ | 6 | 4 | Parker Earle.... | 8 | 4 |
| Bubach......... | 7 | 5 | Seneca Queen ... | 7 | 6 |
| Crescent......... | 9 | 5 | Sharpless........ | 8 | 7 |
| Captain Jack.... | 7 | 6 | Van Deman..... | 7 | 5 |
| Daniel Boone.... | 4 | 4 | Warfield No 2.. | 7 | 6 |
| Gandy....... | 8 | 6 | Windsor Chief .. | 5 | 5 |
| Haverland .... | 6 | 5 | Williams........ | 5 | 4 |
| John Little...... | 8 | 6 | Wilson.......... | 6 | 5 |
| James Vick..... | 4 | 3 | Woolverton...... | 7 | 5 |
| Mrs. Cleveland.. | 9 | 7 | | | |

10 represents maximum of health, 1, badly rusted.

Strange to say, there was hardly any appreciable difference in the health of the two rows at the fruiting time the next year.

An experiment carried on in 1895 with Bordeaux mixture to check this disease gave much more definite results. The plants were sprayed once before fruiting and twice afterwards during the month of August. The results were very satisfactory, the sprayed plants being practically unaffected by rust. The experiment was repeated in 1896, also with satisfactory results, and now that this fungicide is so commonly used against other diseases it will probably be found to be the best agent with which to combat this disease. It should be remembered, however, that in burning the leaves the spores of the fungus as well as many injurious insects are destroyed, and if this treatment is followed by the use of Bordeaux mixture in the spring, there should be no difficulty in controlling leaf rust.

Mildew.

### MILDEW *(Sphaerotheca Castagnei.* Lev.*)*

In dry seasons this fungus which causes the leaves to curl, covering them with a thin cobweb like coating, lessens the crop very materially. Like gooseberry and grape mildew the fruit is also attacked.

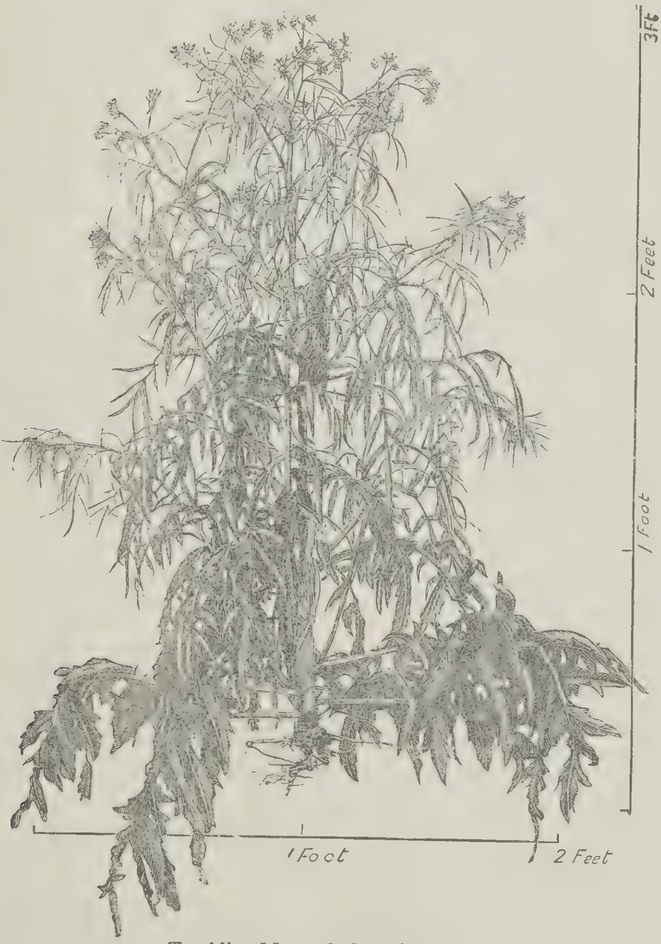
#### REMEDIES.

If Bordeaux mixture is used in early spring as a rust preventive, this disease will also be checked. If it appears to an injurious extent when the berries are ripening flowers of sulphur may be used advantageously. When this is scattered between the plants, the fumes given off under the action of the sun's rays, have a preventive action upon the growth of the fungus.

DEPARTMENT OF AGRICULTURE.

# CENTRAL EXPERIMENTAL FARM.

OTTAWA, CANADA.




Tumbling Mustard, flowering plant.

## BULLETIN No. 28.

# WEEDS.

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE.

To the Honourable
The Minister of Agriculture.

SIR,—I have the honour to submit for your approval Bulletin 28 of the Experimental Farm series on "weeds." This has been prepared under my direction by Dr. James Fletcher, the entomologist and botanist of the Dominion Experimental Farms. The annual losses which occur from the inroads of pernicious weeds are much larger than is generally realized, and where a proper course of treatment is adopted, these losses can be materially lessened. The increased interest which has of late been manifested in this subject by farmers generally augurs well for the future. In the present bulletin most of the noxious species are referred to, and short descriptions given of their appearance and habits, accompanied in many cases with figures which will, it is believed, lead to their easy recognition. Associated with the descriptions of the various species will be found the treatment best adapted for their extirpation. It is hoped that the publication of the information contained in this bulletin will bring about a more general and active war against pernicious weeds, which would undoubtedly result in much benefit to the agricultural community.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,

*Director Experimental Farms.*

OTTAWA, 27th July, 1897.

# THE WORST CANADIAN WEEDS.

There are many definitions of the word weed, but perhaps from a farmer's standpoint the best one is : "any troublesome or unsightly plant that is at the same time useless or comparatively so." As a general statement, it may be said that our most troublesome and aggressive weeds of the farm have been introduced into Canada from other countries ; but, at the same time, it is also true that under special circumstances some of our native wild plants may increase and become "noxious weeds." It must be acknowledged that in all parts of Canada weeds are a source of constant and very considerable loss to farmers. Indeed, so much is this the case that the great prevalence of some varieties in certain districts of the Dominion must be viewed with the gravest alarm, for they have taken such possession of the land as to seriously affect profitable farming. As examples of such aggressive enemies, mention may be made of the Wild Mustard, Quack or Couch Grass and Canada Thistle in parts of almost every province, Ox-eye Daisy in the Maritime Provinces, Penny Cress or Stink-weed in Manitoba, and Tumbling Mustard in Manitoba and the North-west Territories.

The increase of weeds has been frequently due to the fact that farmers have neglected them from not being aware of their noxious nature and power to spread.

The following true statement occurs in an excellent pamphlet "Noxious Weeds in Manitoba and How to Destroy Them," issued by the Provincial Department of Agriculture and Immigration of Manitoba :—"Many of our farmers have only a limited knowledge of weeds, and in many cases do not recognize those that are dangerous on their first appearance. Hence we have 'One year's seeding, seven years' weeding.' There are some weeds so noxious that if farmers knew their real character and recognized the plants on their first appearance, they would postpone all other business until they were destroyed * * * * Self-interest should be a sufficient incentive to farmers to destroy weeds if it is clearly shown that it will pay them to do so."

Another point of considerable importance with regard to noxious weeds is the adoption, as much as possible, of some one English or common name. The names used in this pamphlet have been selected with much care as to those which are most applicable and most widely known. When more names than one are given, the first is preferable. The scientific names, of which only one for each plant is recognized as authoritative by botanists all over the world, are here given, so that the certain identity of each plant mentioned may be known. Few farmers, of course, are acquainted with these scientific terms, even in the case of our commonest weeds, but it would be well if they were ; for certainly much confusion exists in different localities in the application of the English popular names, the same plant being frequently called by one name in one place and by quite a different one somewhere else, or quite as frequently a single name is applied to a number of distinct plants in different places or by different people in the same place. The advantage, or even necessity, of calling a plant by its proper name has been forcibly illustrated in the case of the Tumbling Mustard, now so prevalent in many parts of Manitoba and at Indian Head, &c., in the North-west Territories. This most injurious weed was for some time after its introduction, spoken of generally as 'Tumble Weed," a name properly belonging to a much less aggressive plant, the *Amarantus albus*, one

of the Pigweeds. Owing to the use of this wrong name, little effort was put forth by the settlers to destroy the new enemy, because it was well known all through the west that the true Tumble Weed was a native plant which had never given much trouble. Similarly, the Hare's ear Mustard, a very noxious weed, was left undisturbed by some from having been wrongly spoken of by many as "Black Mustard." The Black Mustard, as a matter of fact, is of very rare occurrence in Canada, and as far as I am aware is not anywhere in the Dominion a troublesome weed in crops.

The present bulletin is issued in response to numerous inquiries as to the nature of the many weeds found on farm lands and the best way of getting rid of them. While it is true that the character of each kind has to be considered, there are certain principles which must be constantly borne in mind by those who wish to clear their land of noxious weeds. In the present age of extensive and easy communication with all parts of the country, and indeed with the whole world, there are frequent opportunities for seeds of weeds being introduced into previously uninfested districts. As an off-set against the great benefits we derive from railways, it has been found that many new weeds have been introduced into new localities through their agency, the seeds being either shaken from cars or cleaned out of them at stopping places. It is important, therefore, to keep watch on all railway banks, and station yards.

There are many ways by which weeds are spread:—

1. By natural agencies. The wind carries seeds long distances, not only in summer, but with dust and over the surface of the snow in the winter. Streams distribute them far and wide along their courses. They are also distributed by seed-eating birds and herbivorous animals, through the stomachs of which the seeds have passed undigested, or by being attached to some part of their bodies by special contrivances, with which nature has provided some seeds for this very purpose, such as hooked and barbed hairs, spines and gummy excretions, &c.

2. By human agency. The seeds of weeds are frequently introduced as "foul seed" mixed with other seeds; they are also imported in hay used for packing or as fodder. In addition to this, weeds are frequently distributed over farms by waggons, harrows, seeders, threshing machines or other agricultural implements. Perhaps the most fertile source of weeds upon a previously clean farm, is manure brought from elsewhere. But, notwithstanding all efforts to the contrary, weeds will certainly be introduced from time to time on to the farms of the most careful, and the wisdom is therefore apparent of farmers becoming acquainted with the different kinds which are likely to cause them loss, and the best way to treat them.

In the following pages will be found short accounts of some of the worst weeds of the country, arranged according to their natural orders, so as to bring together those which are most nearly related.

Weeds, like all other plants, may be simply classified under the three following heads:—Annuals, or one year plants; Biennials, or two year plants; and Perennials, or many year plants. In eradicating weeds, it is of the greatest importance to consider under which of these heads they come, because in most instances the treatment is simple and will be upon the general principles of preventing annuals and biennials from seeding, and perennials from forming new leaves, roots and underground stems.

Annuals—Are those plants which complete their whole growth in a year. As a rule, they have small fibrous roots and produce a large quantity of seed. Examples of this class are found in Wild Mustard, Penny Cress (called in Manitoba "Stink-weed,") Lamb's quarters, Wild Buckwheat, Purslane, Ragweed, Wild Oats. There are also some annuals called "Winter Annuals," which are biennial in habit, that is, of which seeds ripened in the summer produce a certain growth before winter sets in and

then complete their development the following spring. Of these may be mentioned Shepherd's Purse, Pepper grass, Penny Cress, mentioned above, and the Blue Bur.

BIENNIALS—Are those plants which require two seasons to complete their growth, the first being spent in collecting and storing up a supply of nourishment, which is used the second season in producing flowers and seeds. Examples of these are Burdock, Mullein, Evening Primrose and Viper's Bugloss or Blue-weed.

PERENNIALS—Are those plants which continue growing for several years. Perennial weeds are propagated in several ways, but all produce seeds as well. They have two distinct modes of growth, those which root deeply, and those of which the root system is near the surface. The most troublesome are those which extend long under-ground stems down beneath the surface of the ground, as Canada Thistle, Perennial Sow-thistle, Showy Lettuce, and wild Sunflowers. Representatives of the second class or shallow-rooted perennials are: Pasture Sage, Yarrow and Couch Grass. Some perennials extend but slowly from the root by means of short stems or offsets; but produce a large quantity of seed. Of these, Ox-eye Daisy, Dandelion, Golden Rod and Yarrow are examples.

In adopting a method of extermination, the nature of the plant to be eradicated must, first of all, be taken into consideration. Any method by which the germination of the seed in the soil is hastened and then the young plants are destroyed before they produce fresh seed, must in time clean land however badly infested with annual weeds. The seeds of some annuals have very great vitality, and will continue appearing for several years as fresh seeds are brought up to the surface by cultivation. Wild Mustard and Wild Oats have been known to germinate after lying deep in the ground for twenty years. Biennials must be either ploughed up or cut off before they flower. Mowing at short intervals will kill them; but a single mowing will only induce them to send out later branches, which, if not cut, will mature many seeds. Where ploughing is impracticable, this class of plants should be cut off below the crown of the root. For this purpose a spud or a large chisel in the end of a long handle (to obviate the necessity of stooping) is as convenient a tool as can be used. Perennials are by far the most troublesome of all weeds and require very thorough treatment, in some instances the cultivation of special crops, to ensure their eradication. Imperfect treatment, such as a single ploughing, frequently does more harm than good, by breaking up the underground stems and stimulating growth.

There is no weed known which cannot be eradicated by constant attention, if only the nature of its growth be understood. Farmers should be constantly on the alert to prevent new weeds from becoming established on their farms. There are some general rules which all should remember:—

1.—Weeds do great harm by robbing the soil of the plant food intended for the crop and also of its moisture.

2.—Weeds crowd out and take the place of more useful plants, being hardier and, as a rule, more prolific.

3.—Weeds are a source of great loss to farmers as they require much labour and time to eradicate, and frequently compel them to change the best rotation of their crops, or even perhaps to grow crops which are not the most advantageous.

4.—All weeds bearing mature seeds should be burnt, and under no circumstances should they be ploughed under.

5.—*Weeds of all kinds can be eradicated* by constant attention and by adopting methods in accordance with their nature and habits of growth: Therefore,

(*a.*)—Never allow them to seed;

(*b.*)—Cultivate frequently, particularly early in the season, so as to destroy seedlings while of weak growth;

(*c.*)—For shallow-rooted perennials, either trench the land deeply or plough so lightly that the roots are exposed to the sun and dry up; for deep-rooted perennials, the only means of destroying them is to prevent them from forming leaves and thus storing up nourishment in their root-stocks, to sustain future growth. This can be done by constant cultivation The importance of leaves to plants can be seen by the serious injuries frequently inflicted even upon large forest trees by the destruction of their leaves by insects. The American larches, over thousands of acres in Canada, have been destroyed during the last ten or twelve years by having most of their leaves eaten by the imported larch saw-fly. Fruit trees stripped of their leaves by caterpillars during one season seldom mature a good crop of fruit the next year.

All weeds can be destroyed by the use of the ordinary implements of the farm, the plough, the cultivator, the spud and the hoe; but some experience is necessary to know what is the best time to work certain soils or to deal with special weeds. No general rules can be given, as the necessary treatment will vary in different districts on different soils and under different climatic conditions. What may be the proper treatment in one place may fail in another. Perennial plants, if allowed to develop flower stems and then ploughed down (or first mowed and then ploughed under), will by the production of the flower stems, have so far reduced the nourishment stored up in the rootstocks that they are much weakened and can afterwards be easily dealt with. On the other hand, it is found in the West, that all the weeds and other plants decay readily if prairie land or meadows be broken in May or early June. Land so treated can therefore be cleaned far more easily than if the operation of breaking is delayed until July. This is due to the climate and the succulent nature of all parts of the plant at that season.

### Summer-Fallowing.

As an agricultural practice, although not adopted to any large extent in the older provinces, summer fallowing is essentially necessary in Manitoba and the North-west Territories, where the conservation of moisture in the soil is of the utmost importance, the farms are large, labour is scarce and the time for preparing the land in autumn and spring is very short. The question is so often asked whether this practice is a wise one that I submit herewith extracts from four replies from men of much experience and who, in my judgment, were the best qualified to give useful and authoritative advice upon this subject.

Mr. Angus Mackay, Superintendent of the Experimental Farm for the North-west Territories, at Indian Head, says:—

"Summer-fallowing is absolutely necessary in the West to ensure a crop and get the work done, owing to the shortness of the time available in the fall and spring. All land intended to be cropped should be summer-fallowed the year before. This will get the land into good condition, keep down weeds and produce the best results in every way. Summer-fallowing is generally started too late in the summer. It should be begun as soon as possible after seeding in the spring, so as to get the full advantage of the spring rains. As a rule, one ploughing only is advisable, because in wet years two deep ploughings would produce too much growth and retard the ripening of the grain. If the land should be weedy, the proper way to keep it clean is to harrow two or three times after ploughing. If farmers are willing to risk getting a smaller crop by sowing on stubble so as to get the grain to ripen earlier and in windy sections to avoid the danger of blowing, the proportion so treated should never exceed one third of their land.

Mr. S. A. Bedford, Superintendent of the Experimental Farm for Manitoba, at Brandon, Man., says:—"In regard to summer-fallowing: I consider it is absolutely essential on farms outside of the Red River valley, where, however, the advantages are not so clearly apparent, but even there I contend that the farmers would be benefited from a proper fallow every three or four years; too frequent fallowing in the Red River valley causes very rank vegetation and lodged grain. On our lighter and better drained soils this seldom occurs. Unfortunately, in this country much of the so-called summer-fallowing is badly done."

Mr. Hugh McKellar, Chief Clerk, Department of Agriculture for Manitoba, commenting upon a statement made by a Manitoba farmer that he could not afford to allow his land to lie idle as a summer-fallow for a year, says:—

"Some farmers say they cannot afford to summer-fallow. I may say farmers cannot afford *not* to summer-fallow, for it is done by horse-power, of which they generally have a supply on hand at that time of the year, with sulky or gang ploughs, by which they will plough from five to seven acres a day with four or six horses. In some of the wooded parts of the province, however, the land under cultivation by farmers is restricted in area. If a farmer has only forty or fifty acres under cultivation, he might well crop all of it every year, each year having a few acres of roots or corn, but on those large farms, such as you passed through with me out at Wawanesa, Souris or Hartney, where farmers crop 300 or 400 acres or more each year, it would be useless to crop a field of 150 or 200 acres with roots or ensilage corn. Such a field would feed 150 head of cattle for a year, and as you know the cattle are not yet in the country. Summer-fallowing, properly done, that is, ploughed early and kept clean afterwards, is in my opinion the only way in the west to keep down the many noxious weeds which would otherwise become our masters, and I may say this is the method followed by our most practical farmers.

"Our farmers are now learning the importance of knowing the different weeds and fighting them according to their different natures, but in this country some weeds are extremely persistent and hard to control. The natural conditions are all in favour of the weeds, but their eradication is only a matter of diligent, careful work and all the weeds, even the worst, can certainly be kept in check."

The Hon. Thomas Greenway and the officers of his department have taken active measures to prevent the spread of these enemies of the farmer in Manitoba by publishing bulletins and holding meetings throughout the province where the different kinds of dangerous weeds have been described and the best way to fight them explained.

Mr. Richard Waugh, Editor of the *Nor-West Farmer*, says:—

"The general experience of the best class of farmers in Manitoba and the Territories goes to show that for wheat growing especially, summer-fallowing, if properly done, is a great benefit. One strong point in its favour is that it can be best done at a season when no other work is pushing. Many mistakes have been made in doing this kind of work. But within the last two years careful observations and free discussion in farming papers and at farmers' institutes have led to practical unanimity as to the way in which it can be done with the least possible amount of labour, the best time and way to do it, and the results that may be reasonably expected from timely and well done work.

"Men with ripe Ontario experience began, as a rule, by ploughing twice, and occasionally even thrice. But it was soon found that this plan of action led to an overgrowth of straw, later ripening and an inferior quality of grain. I have for the last ten years been advocating one ploughing, going, if necessary, an inch deeper than any former ploughing

on the same land, for nearly all the land now likely to be benefited by it. I urge that the harrow shall follow the plough, so as to preserve all the moisture and at the same time start into free germination all the foul annual seeds then in the soil, repeating the harrowing as often as the weeds show up in the seed leaf. This consolidates the lower stratum of the soil while killing out all the foul seeds and at the same time putting the land in better condition for preserving all the sap. If there has been a wet spell in summer (a rare thing here) and the weeds get a start, a skimming with the spade cultivator or similar appliance on a warm dry day will be needed, as after the weeds have got a good start harrowing will help rather than hinder them.

"Land thus treated will start the grain next spring earlier and more evenly than any other, the crop will ripen faster with a full yield of the best grade of wheat that Canada is fit to produce. If the land is infested with Thistles or Stink Weed there must be some modification of this plan. For Stink Weed and other noxious annuals, I would follow the same course, but keep stirring the surface more, so as to work out all the foul seeds I could in the topmost two or three inches, and while ordinary annual weeds might be let grow after August, I would keep stirring for Stink Weed until snow came. If any plant of Stink Weed is left alive in the fall it will live on all winter under the snow and start early in the spring, often overtopping the grain crop in May. I will not now go over the whole case for or against summer-fallowing. Green cropping may help in a rotation of crops that would enable us to dispense to that extent with fallow work, and there must be a difference in the treatment for such perennials as Couch Grass and Thistles; but when farming is to be done on hundreds of acres with a very limited working force I hold that wheat cannot be profitably grown without summer-fallowing, and the live question for to-day is not whether we shall summer-fallow, but how it can be best and most cheaply done to suit the purpose."

Through the kindness of the Honourable Minister of Agriculture for the Province of Manitoba I have had exceptional opportunities, during the past three summers, of travelling through all the important wheat growing districts of that province. It was very apparent to me during these visits that in many instances summer fallowing was begun much too late in the season to get the best results as to weed eradication. By the middle of July several kinds of the most noxious annual weeds have developed their seeds sufficiently for these in the dry climate of Manitoba to ripen beneath the soil, even when ploughed well under out of sight, which, however, is by no means always done. There is always of course a temptation to put off the ploughing of land which is to be summer-fallowed as long as possible so as to reduce the subsequent labour of cultivating and harrowing. From a careful study of the development of weeds on summer-fallows in Manitoba for three summers I believe that to obtain the best results in the eradication of such early-ripening plants and annual weeds as Stink Weed, False-flax, Ball Mustard, Pepper-grass, Shepherd's Purse, Blue Bur, Golden Fumitory, etc., all summer-fallowing should be completed if possible not later than 12th of July, so that no risk may be run of ploughing down mature seeds.

### SEEDING DOWN.

The prevention of seed-production is of great importance when clearing land of weeds. Many weeds may be held in check to a large extent, particularly upon land, which is not required for cropping, by seeding down to grass or clover, but, of course, any ripe seeds of weeds which are in the soil, will germinate as soon as the land is broken up again. But in the same way that weeds crowd out crops and reduce the yield of seed, so may

weeds themselves be choked by a more vigorous plant, which will prevent them getting light and air such as the free-growing grasses, millet, buckwheat, clovers, or even a thickly sown grain crop. This treatment will destroy the seedlings, which appear at the same time as the crop sown, and thus prevent them producing other seeds. When the land is ploughed again, those weed seeds turned up near enough to the surface to germinate, must be killed by the frequent use of the cultivator, harrow or weeder.

An excellent plan of smothering out a restricted patch of any troublesome weed, frequently practised in Manitoba is to build a straw stack over the spot; a manure pile is used in the same way in the east.

## THE USE OF CHEMICALS.

The killing of weeds by the application of chemicals is not often a practical remedy, but salt, coal oil, sulphuric acid and carbolic acid have been used successfully on limited areas. Salt, however, has given excellent results when applied to land infested with the Orange Hawkweed or "Paint Brush" in the State of Vermont and in the Eastern Townships of the province of Quebec. Salt is also very useful for the destruction of many kinds of weeds on gravel walks. Mr. F. T. Shutt, Chemist to the Dominion Experimental Farms, recommends the following for destroying weeds upon gravel walks: 1 lb. white arsenic; 2 lbs. washing soda; 3 gallons of water. Boil and dilute with three times the volume of water. Apply while warm in fine weather. A thorough application at the beginning of the season will be sufficient to keep a path clean throughout the summer. A simpler and a very effective formula is as follows: 2 lbs. blue vitrol; 6 gallons of hot water, dissolve in a crock and apply as above. Mr. L. A. Dewey, Assistant in the United States Division of Botany, says, when speaking on the use of chemicals:—"A few drops of carbolic acid applied at the base of the main stem with an ordinary machine oil can is the best method that has, as yet, been devised for killing weeds with chemicals." But, on the whole, the use of chemicals as weed destroyers has not given much satisfaction, owing to their cost and the expense of applying them.

Names given to some of the different arrangements of the flowers in plants, which for the sake of brevity it is necessary to use in the following list, are as follows:—

A *Spike*, when the flower stalks are very short or wanting altogether, example Plantain, Wheat.

A *Raceme* differs from a spike in the flowers being borne upon foot-stalks of an equal and of a noticeable length, example Lily of the Valley.

A *Panicle* is a compound raceme or a raceme with branched foot-stalks; example, Oats.

A *Corymb* is a raceme in which the footstalks are gradually lengthened from the apex downwards, so that all the flowers are brought to the same level, or nearly so; example, Groundsel.

A *Cyme* is a panicle with the foot-stalks so developed or contracted as to form a flat-topped head, the central flowers generally blooming first; example, Elder, Dogwood.

A *Head* is when numerous flowers are arranged upon a disk or receptacle; example, Ox-eye Daisy.*

An *Umbel* is when all the flowers are supported upon foot-stalks of equal length; example, Geranium. If each of the foot-stalks of an umbel bears a secondary umbel as in the carrot, it is a *compound umbel*, and, indeed,

* In the following table of weeds, the heads of flowers of plants of the Sunflower Family are treated of as if they were single flowers.

most of the forms above mentioned by repetition upon themselves become *compound.*

The plants mentioned in the following list are those which have been most frequently inquired about by my correspondents Those preceded by an asterisk are "bad weeds" and care should always be taken to destroy them whenever they are noticed. There are many others which might have been included in a full list of the weeds of Canada, but in nearly every case these are so similar to allied species treated of here that to prevent confusion it was thought best to omit them, unless they had been actually inquired about. The Botanist will at all times be pleased to hear from correspondents concerning weeds, and will give all information in his power on their habits, and the best means of eradicating them. It is particularly requested that when inquiries are made about weeds or their seeds, samples may be sent for examination. Such samples and all correspondence referring to them may be sent FREE by post, and will be promptly attended to.

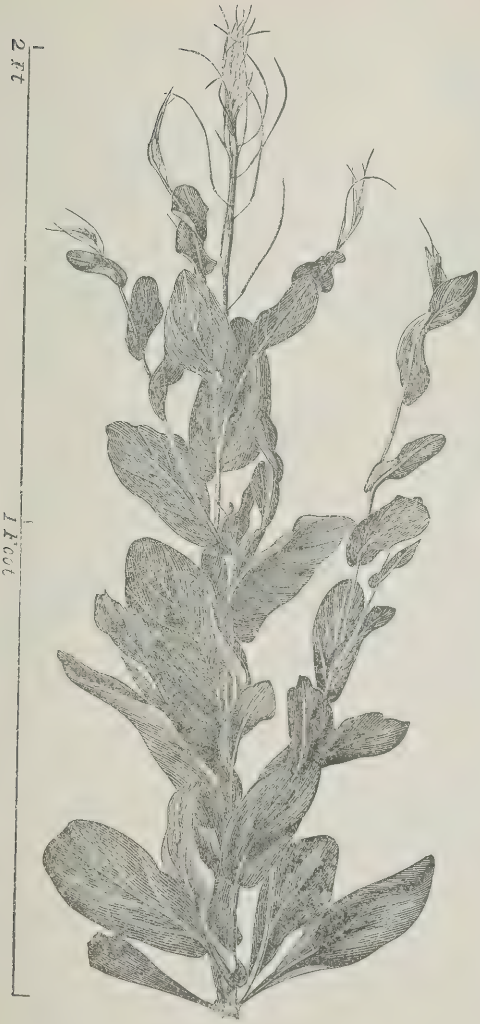
## SOME WEEDS OF SPECIAL INTEREST.

Large numbers of specimens of plants found growing in field-crops or gardens are every year sent to the botanist for identification or for advice as to the best means of eradicating them. Figures have been prepared of some of the kinds most frequently inquired about and they are submitted herewith. These plants are not all among the most agressive enemies of the farmer, but the numerous demands for information concerning them seem to make it advisable that recognizable figures should be published.

### Tower Mustard.

This is a tall slender plant 2 to 4 feet in height, with small yellowish white flowers which are followed by a great many slender pods 3 inches long, borne erect and closely pressed to the stem. The root-leaves are hairy, but all the rest of the plant is very smooth and glaucous, that is, covered with a whitish bloom as seen on cabbage leaves. This is not a very troublesome weed. It has been sent in as occuring in summer fallows in Manitoba and in clover fields in the older provinces.

Tower Mustard.




Hare's-ear Mustard.

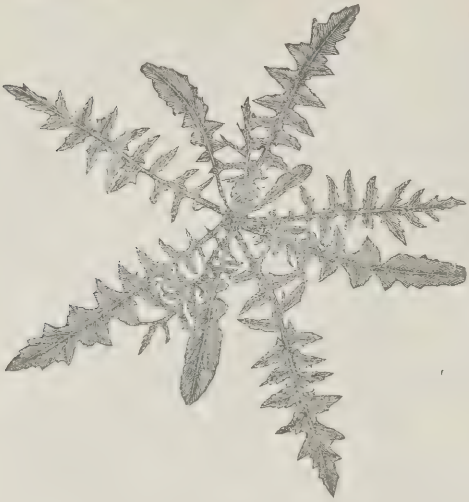
## HARE'S-EAR MUSTARD.

This is an introduced European plant which has only appeared as a noxious weed in the grain fields of the west during the last five years, but has already spread widely through Manitoba and the North-west Territories. It is an extremely injurious plant with large grayish green succulent leaves like those of a young cabbage, which chokes out grain and absorbs much moisture from the soil. The ripe stems are wiry and stiff, growing sometimes 4 feet high and giving trouble when grain is harvested. It is a slender branching annual and takes its name from the oblong-oval leaves of the stem, which are shaped like a hare's ear.

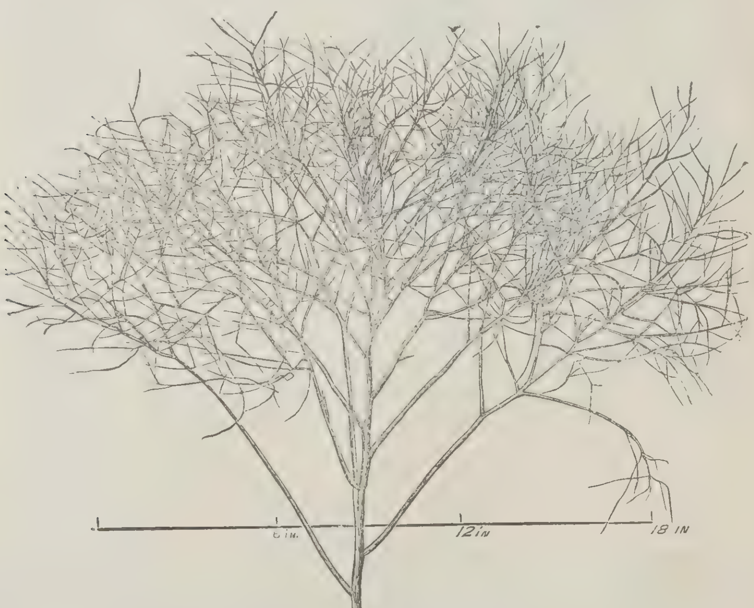
## Tumbling Mustard.

I have no hesitation in calling this the worst weed we have in Canada. It is only about 10 years since it was first noticed as a troublesome pest of the farm and although great efforts have been made to control it, it has gradually spread over hundreds of thousands of acres in the North-west Territories and Manitoba. It has all the bad characteristics of the other mustards and besides is a large, free-growing, exceptionally prolific plant, of which, when the seeds are ripe, the head breaks off and then becomes a

"tumbling weed" being blown for miles across the prairies in autumn and during the winter and in that way scattering the seeds quickly over wide areas. The leaves of the young plants are quite different from those borne on the stems which are divided up into thread-like divisions as shown in the figure of a flowering plant on the frontispiece. Normally this plant in its home, the south of Europe, is a winter annual, the seeds germinating one season and the plants not flowering until the next year. This is also the case occasionally in Ontario and the North-west; but for the most part in North America, it is a true annual, the seeds germinating in spring, the plants developing quickly and producing their tall flowering stems covered with pods about 3 inches long, each one of which contains about 120 seeds. A single plant sent from Indian Head, N.W.T. bore more than one million and a-half seeds. The seeds are very small, about half the size of timothy seeds and are of a reddish or greenish brown colour.



Tumbling Mustard, Seedling.

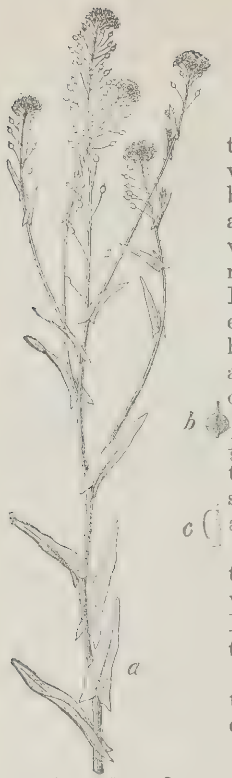



Tumbling Mustard: a tumbler with ripe seeds.

## Stink Weed.

Stink Weed.

No weed is better known in Manitoba than this with its early ripening, yellowish, flattened pods, each one about the size and shape of a five cent piece and containing 16 seeds. The rank, nauseous odor of this plant, the rapidity with which it spreads, and the almost incredible difficulty of eradicating it when once established, make it important that its appearance should be known to everyone, so that no effort may be spared to destroy every plant as soon as noticed. Seeds germinate in autumn and plants actually in flower when winter sets in, will mature their pods the following spring. There are frequently two crops of seed in a season. The only way to clean land of this pest is to adopt some treatment by which the seeds are made to germinate and the young plants are destroyed before they can ripen fresh seeds. Plants with fully formed pods should never be ploughed in, and when plants are mowed they should be burnt as soon as they are dry enough. The seeds are very dark brown, flattened, beautifully marked with concentric grooves on the surface. When wet they are covered with a jelly-like coating by means of which they adhere to any object with which they come in contact and are thus distributed widely and easily by sticking to the feet of animals and to farm implements.




Ball Mustard.

## Ball Mustard.

This is one of the new weeds in grain fields. From the rapidity with which it has spread all through the west, there is no doubt that it is a weed which must be fought vigorously by farmers. It is alarmingly abundant in Manitoba and the North-west Territories wherever wheat is grown. Specimens have also been received from British Columbia, Ontario and Prince Edward Island. Ball mustard is a rather slender erect annual (or winter annual) two or three feet high. The leaves on the stem are arrow-shaped and are covered with star-shaped hairs. The flowers are orange yellow, so that the plant is easily recognized at a distance when growing in a crop; they are about $\frac{1}{8}$ of an inch in diameter and are borne in clusters at the ends of the branches. The small roundish, single-seeded pods on slender footstalks are borne thickly all along the gradually lengthening branches.

The cut shown herewith has been kindly loaned by the United States Department of Agriculture, and was first used in Circular No 10 by Mr. Lyster H. Dewey, "Three New Weeds of the Mustard Family" to whom our thanks are tendered.

The cut shows at *a* the tip of a plant a quarter of the natural size, at *b* a pod natural size and at *c* a seed enlarged.

## Pepper Grass.

This plant is a native annual or winter annual. As a rule it is not very troublesome in crops: but under certain climatic conditions it becomes an enemy of no small importance. During 1896 no weed was more frequently sent in as a pest in wheat lands, and at meetings of farmers held during the same summer in Manitoba, this weed above all others was the one inquired about. At similar meetings in 1897 it was only mentioned once, viz., at Glenboro, Man. Pepper grass is a slender herb 12 to 18 inches high, which developes in the shape of a miniature tree with a central stem and a large spreading head. It produces an enormous quantity of very small reddish seeds, two in each of the small, flat pods which are borne thickly all along the branches. This plant is generally most troublesome after wet springs on dry or light land, occasionally a serious pest in Manitoba and much complained of by farmers in wet springs, particularly in wheat sown on stubble. Although generally described as an annual, pepper grass, is much more of a biennial in habit. Fall and spring ploughing or cultivating will destroy those autumn-germinated plants which are the ones most likely to do harm in wheat crops.

Pepper Grass.

## Cow Cockle.

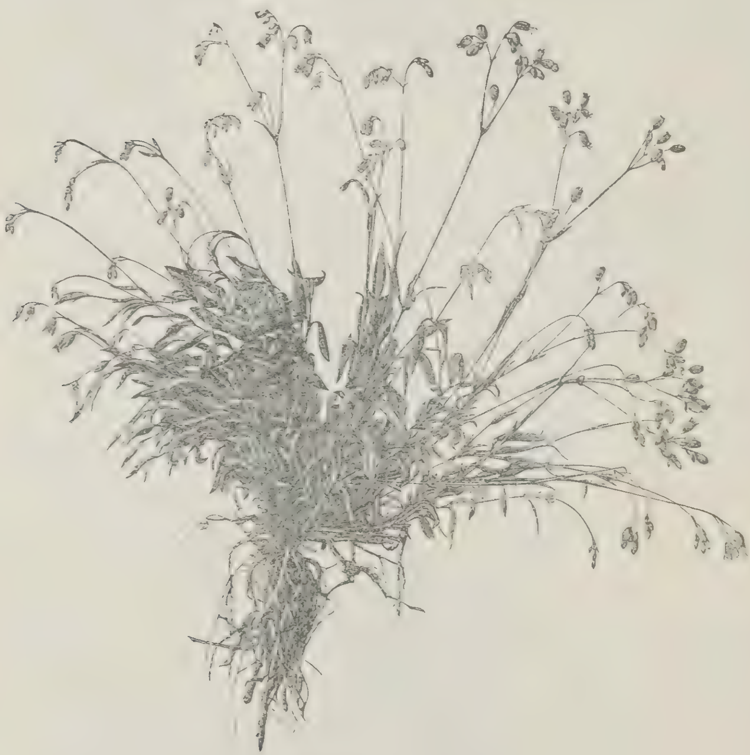
The cow cockle also called Cow-herb and China Cockle is an annual plant which has been introduced into Manitoba from southern Europe. It has spread with rather alarming rapidity throughout the southern portions of the province and has been detected in many other parts of Manitoba and the North-west Territories. The cow cockle grows from seed every year and forms a rather elegant plant from one to two and a-half feet high, much

Cow Cockle.

branched and bearing, in July, a great many pretty pink flowers about half an inch across; these are followed by roundish capsules contained in the five angled enlarged calyces. The seeds are round, hard and black, slightly roughened on the surface, a character by which they can be easily distinguished from the seeds of wild vetches, which are of about the same size.

## Bladder Campion.

This well known weed is a deep-rooting perennial which is well established in some parts of the Maritime Provinces and Quebec. It is more often a road-side weed than a crop pest; but in some places it has given a



Bladder Campion.

good deal of trouble to farmers. It is easily recognized by its white flowers and prettily veined bladder-like calyces.

## Orange Hawkweed: "Paint Brush."

This pernicious member of the daisy and sunflower family has spread rapidly since its introduction into the Eastern Townships of the Province of Quebec and parts of New Brunswick. It is a vigorous grower throwing out many creeping branches close to the ground, and with its thick foliage crowding out grasses in pastures. It is a shallow-rooted perennial which bears clusters of deep orange (sienna red) or yellow flowers. The seeds

are furnished with copious down by means of which they are scattered freely by wind. In upland and mountain pastures which cannot be easily ploughed, this plant soon crowds out the grasses and renders the pastures useless. In land used for crops, ploughing and cultivation with hoed crops

Orange Hawkweed: "Paint Brush."

will destroy it. For upland pastures it has been found by Professor L. R. Jones of Vermont, who kindly lent the figure given herewith, that salt broad casted at the rate of $1\frac{1}{2}$ tons to the acre will destroy the weed without any injury to the grass.

Viper's Bugloss.

### VIPER'S BUGLOSS.

This weedy, prickly denizen of road-sides and waste places attracts frequent attention with its conspicuous wand of pretty bluish-purple flowers and pink buds. It is a biennial and can be easily destroyed by spudding before the seeds are ripe.

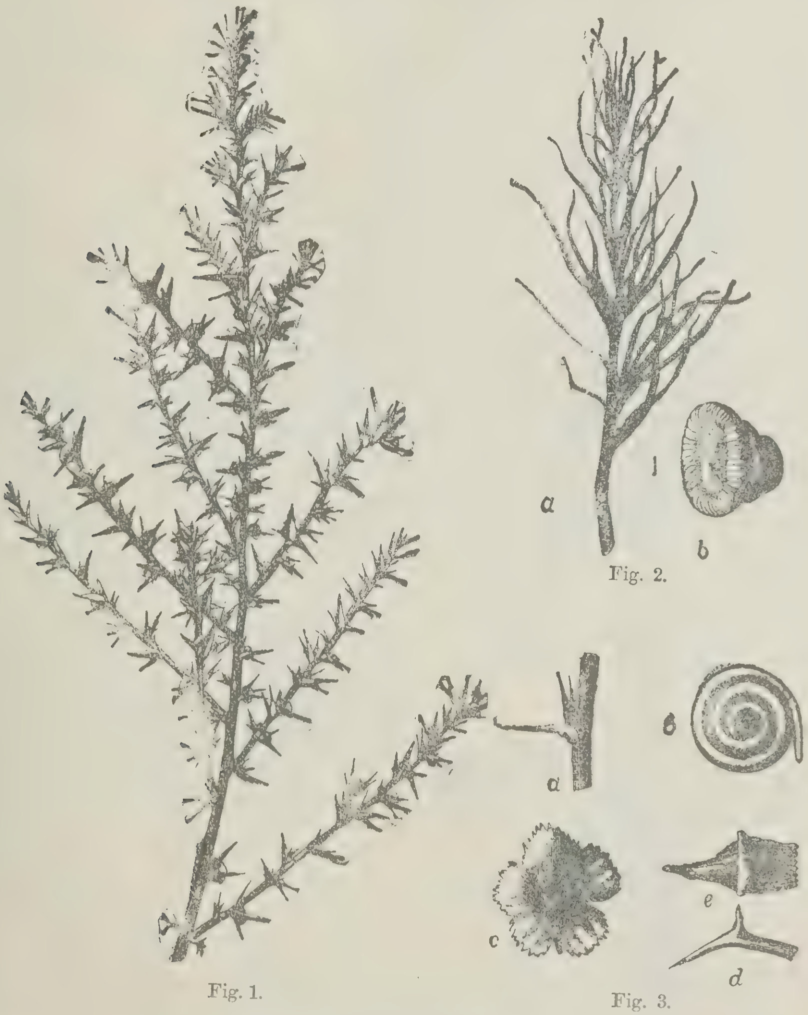
### BURS.—HOUND'S TONGUE.

The common bur is well known in every part of Canada. It is seldom seen in crops and is easily destroyed by spudding. The rough barbed seeds are perhaps most injurious by getting tangled the wool of sheep and the hair of dogs.

Burs.

## Russian Thistle.

So much attention has been drawn to this plant by the Manitoba Department of Agriculture since its discovery in Manitoba, that the farmers of that province should he well informed as to its appearance and characteristics. Although occasional specimens of the Russian Thistle have been found in Ontario, there is little probability of its ever becoming a menace




Russian Thistle.

Fig. 1.—A branch of a mature plant. Fig. 2.—A young stem before flowering, and a single seed enlarged. Fig. 3.—Enlarged prickles, flower and seed from which the seed coat has been removed.

to agriculturists except in a country where the plants can blow long distances in winter. In Manitoba and the North-west Territories the farmers as a rule are now exceedingly wide awake as to the danger of neglecting noxious weeds and it is very unlikely that this weed will be allowed to propagate and spread, now that its dangerous capabilities have been made known.

Curled Dock.

### The Curled Dock.

This is perhaps the commonest of all the docks. As a weed in cultivated land this dock is most abundant in the two extremes of the older settled portions of Canada, namely in Nova Scotia and the Niagara district. These tall coarse plants look very unsightly in hay fields and other cultivated land—with a little care and constant attention they are easily eradicated by spudding and pulling.

The excellent figures of Tower Mustard, Pepper Grass, Bladder Campion, Viper's Bugloss, Burs, and Curled Dock, were made specially for this bulletin from photographs taken by Mr. F. T. Shutt.

Indian Hay or "Sweet Grass."

INDIAN HAY OR SWEET GRASS.

One of the most troublesome weeds in Manitoba is Sweet Grass. It is frequently and incorrectly spoken of as Quack or Couch grass, quite a different plant which roots near the surface of the soil and which can be destroyed by ploughing shallow and then cultivating frequently. The Sweet Grass on the other hand roots deeply and shallow ploughing merely encourages it to grow. The treatment which seems to have given the best results in Manitoba, is to plough in spring when the grass is in flower and then seed down heavily at once.

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. — Height. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| BUTTERCUP FAMILY. | | | | | |
| White Anemone, Pennsylvanian Anemone. | *Anemone dichotoma*, L., native | Manitoba. | Perennial, 12 in. | June-Aug. | July-Sept. |
| Long-fruited Anemone. | *Anemone cylindrica*, Gray, native. | Ont., Que. | Perennial, 2 ft. | June...... | July-Aug. |
| Tall Buttercup...... | *Ranunculus acris*, L., Europe. | East...... | Perennial, 2 ft. | June-Aug. | July-Sept. |
| FUMITORY FAMILY. | | | | | |
| Golden Fumitory ... | *Corydalis aurea*, Willd., native. | Manitoba. | Biennial, 6–12 in. | June..... | June-July |
| MUSTARD FAMILY. | | | | | |
| Marsh Cress........ | *Nasturtium palustre*, D C., native. | E.Canada, Man. | Perennial, 1–3 ft. | June-Sept | July-Sept. |
| Tower Mustard..... | *Arabis perfoliata*, Lam., Europe. | General... | Biennial, 2-4 ft. | June, July | July-Aug. |
| Hairy Tower Mustard. | *Arabis hirsuta*, Scop., native. | Manitoba. | Biennial, 1-2 ft. | " | " |
| Western Wallflower, Prairie Rocket. | *Erysimum asperum*, D. C., native. | " .. | Biennial, 6-12 in. | " | " |
| Small-flowered Wallflower. | *Erysimum parviflorum*, Nutt., native. | " .. | Biennial, or perennial, 12–18 in. | " | " |
| Wormseed Mustard. | *Erysimum cheiranthoides*, L., native. | General... | Annual and biennial, 12 in. | " | " |
| *Hare's-ear Mustard | *Conringia orientalis* (L.), Andrz., Europe. | Manitoba. | Annual, 1–2½ ft. | " | " |
| Cut-leaved Tansy Mustard. | *Sisymbrium incisum*, Engelm., native. | " .. | Annual and biennial, 1-4 ft. | June...... | July...... |
| Crowded Tansy Mustard. | *Sisymbrium incisum*, var., *Hartwigianum*, Watson, native. | " | Biennial, 1-4 ft. | " ..... | " |
| Tansy Mustard...... | *Sisymbrium canescens*, Nutt., native. | Man., Ont. | Annual, 12 in. | " ..... | " |
| *Tumbling Mustard. | *Sisymbrium altissimum*, L., (=*S. sinapistrum*, Crantz.), Europe. | N. W. T., Man. | Annual and winter annual, 1-4 ft. | June, July | July-Aug. |
| *Wild Mustard, Charlock, Cadluck, Herrick. | *Brassica Sinapistrum*, Boiss., Europe. | General... | Annual, 1–3 ft. | June-Sept | July-Sept. |
| *Bird Rape......... | *Brassica campestris*, L., Europe. | Manitoba. | Annual, 1-3 ft. | " | " |
| *False Flax, Gold of Pleasure. | *Camelina sativa*, Crantz, Europe. | Manitoba, N.W.T., Ont. | Annual and winter annual, 1-2 ft | June, July | " |

Weeds, with their chief characters.

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of Propagation and Distribution. | Place of Growth, and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| White, 1-1½ in., solitary; head of fruit round. | Seeds and root-stocks. | Low meadows; hay | Plough up sod and follow with hoed crop. |
| Greenish white, ½-in., 2-6 flowers; head of fruit cylindrical, 1-in. long. | Seeds, wind... | Upland meadows, pastures. | " |
| Yellow, ¾-in., solitary ... ......... | Seeds, in hay. | Meadows; hay and pasture. | " |
| Yellow, ⅓-in., raceme.............. | Seeds......... | Wheat fields ..... | Summer fallow; cultivate fall and spring. |
| Yellow; raceme, 1-3-in............ | Seeds, in hay. | Lowlands; grain fields and hay. | Plough fall and spring. |
| Yellowish-white; racemes slender, elongated; pods erect, narrow, smooth, close to stem, only root leaves rough. | Seeds....... | Grain and clover fields. | Plough fall and spring, hand-pull before seeds ripen |
| White; very similar to above, but smaller and stems hairy. | " ........ | Grain fields and summer-fallows. | " |
| Yellow, nearly 1-in.; racemes elongating in fruit; pods angled, 5-in. long, spreading. | " ........ | Summer-fallows... | " |
| Yellow, ¼-in.; racemes elongated; differing from above in the small flowers, short pods, 1-2½-in. long, ascending and close to stem, covered with short gray hairs. | " ....... | " .. | " |
| Yellow, ⅛-in.; racemes elongated; pods small, less than 1-in. on slender spreading stalks. | " ........ | Grain fields, summer fallows, waste places. | " |
| Creamy white, ¼-in., racemes elongated; pods 4-in., square, ascending; leaves quite smooth, entire, succulent, glaucous. | " ........ | Grain fields....... | Hand-pull, summer fallow, hoed crops. |
| Yellow, ⅓-in.; racemes elongated; pods smooth, spreading, curved, ¾-in.; seeds, 1-ranked; leaves thin, green, almost without hairs. | " ........ | Grain fields and summer fallows. | " |
| As above, but pods short about ¼-in., ascending, close to stem, forming a crowded raceme; seeds, 1 or 2-ranked. | " ....... | Grain fields and summer fallows. Often seen on sod roofs in the west. | " |
| Resembling No. 13, but smaller, generally more branching and grayer in colour; leaves finely cut up; pods, ⅓-½-in. on stalks of equal length, ascending, seeds, 2-ranked. | " ........ | do .. | " |
| Yellow, pale, ⅓-in., racemes elongated; pods, 2-4-in., very slender, spreading, seeds greenish brown. | Seeds, wind... | Grain fields....... | " |
| Yellow, ½-in., racemes; pods erect, 1-1½-in., one-third being an empty or 1-seeded, two-edged beak; stems, bristly-hairy, purple at joints. | Seeds, in grain | " ........ | " |
| Yellow, bright, ⅓-in. racemes; pods, 1¼-2½-in., spreading; stems perfectly smooth, glaucous. | " .. | " ........ | " |
| Yellow, ¼-in., racemes; pods, pear-shaped, many seeded. | Seeds, in grain, flax & clover seed. | Grain, fall wheat, flax and clover fields. | " Sow spring grain. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. — Height. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| MUSTARD FAMILY. | | | | | |
| *Ball Mustard...... | *Neslia paniculata* (L.), Desv., Europe. | Manitoba. | Annual and winter annual, 1-2 ft | June, July | July-Sept. |
| *Shepherd's Purse... | *Capsella Bursa-pastoris*, Medic., Europe. | General... | " .. | May-Oct. | June-Oct. |
| *Stink-weed, Penny Cress, "French Weed." | *Thlaspi arvense*, L., Europe. | General; most abundant in Man. | " .. | " | " |
| *Peppergrass ....... | *Lepidium apetalum*, Willd. (=*L. intermedium*, Gray), native. | General; most injurious in the west. | " .. | " | " |
| CAPER FAMILY. | | | | | |
| Spider Flower....... | *Cleome integrifolia*, L., native. | Manitoba. | Annual, 1-3 ft. | July-Aug. | August. .. |
| ST. JOHN'S-WORT FAMILY. | | | | | |
| Common St. John's-wort. | *Hypericum perforatum*, L., Europe. | General... | Perennial, 1-2 ft. | June-Sept | June-Sept |
| PINK FAMILY. | | | | | |
| *Cow Cockle........ | *Saponaria Vaccaria*, L., Europe. | Manitoba. | Annual, 2 ft. | July-Aug. | Aug.-Sept |
| Sleepy Catchfly..... | *Silene antirrhina*, L., native. | " .. | Annual, 1-2 ft. | June-Sept | July-Sept. |
| Night-flowering Catchfly, Sticky Cockle. | *Silene noctiflora*, L., Europe. | General .. | Annual and winter annual, 1-2 ft | July-Aug. | Aug.-Sept |
| *Cockle, Corn Cockle | *Lychnis Githago*, Lam., Europe. | " .. | Annual, 1-2 ft. | July.-Sept | Sept...... |
| *Chickweed......... | *Stellaria media*, Smith, Europe. | " .. | Annual and winter annual, prostrate. | April-Nov | Apr.-Nov. |
| Bladder Campion.... | *Silene Cucubalus*, Wibel (=*S. inflata*, Smith), Europe. | " .. | Perennial, 1-2 ft. | June-Aug | July-Sept. |
| PURSLANE FAMILY. | | | | | |
| *Purslane, Pusley... | *Portulaca oleracea*, L., Europe. | " .. | Annual, prostrate. | July till frost. | Aug. till frost. |
| MALLOW FAMILY. | | | | | |
| Common Mallow, Dwarf Mallow. | *Malva rotundifolia*, L., Europe. | " .. | Biennial, prostrate. | June-Oct. | July-Oct.. |
| Mouse-ear Chickweed | *Cerastium vulgatum*, L., Europe. | " .. | Perennial, prostrate. | May-July. | July-Aug. |
| ield Chickweed.... | *Cerastium arvense*, L., native. | Manitoba, Quebec, Maritime Provinces | Perennial, 6 in. | " | " |
| orn Spurry........ | *Spergula arvensis*, L., Europe. | General .. | Annual, 6-12 in. | June-July | July-Sept. |
| ladder Ketmia, Flower of an hour. | *Hibiscus trionum*, L., Europe. | Western Ontario. | Annual, 1-2 ft. | July-Aug. | Aug.-Sept |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of Propagation and Distribution. | Place of Growth and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Orange yellow, ⅛-in., racemes, much elongated in fruit; pods nearly spherical, 1-seeded. | Seeds, in grain | Grain fields.... . | Pull, summer fallow, hoed crops. |
| White, ⅛-in., racemes, much elongated in fruit; pods, triangular. | Seeds. ....... | Everywhere....... | Constant hoeing and cultivation. |
| White, ⅛-in. racemes, much elongated in fruit; pods flat and round, over ½-in. | " ........ | Grain fields, waste places. | Mow and burn mature plants, thorough cultivation. |
| Whitish, minute, $\frac{1}{16}$-in., racemes, much elongated in fruit; pods flat, roundish. ⅛-in. 2-seeded. | " ...... | Grain fields, after a wet spring. | Plough or cultivate fall and spring. |
| Reddish purple, 1-in., petals 4, stamens 6, long and conspicuous; racemes; pod flattened, hanging, 1½-in.; leaves 3-parted, strong smelling. | Seeds, carried by floods. | Grain fields and low spots. | Pull, cultivate. |
| Yellow, ½-in., cymes............... | Seeds, carried in hay, root stocks. | Pastures and fields | Break up sod, cultivate. |
| Pink, ¾-in., cymes; calyx 5-angled, covering ripe pods; leaves succulent and glaucous; seeds $\frac{1}{10}$-in. black, minutely roughened. | Seeds in grain. | Grain fields... . . | Pull, cultivate. |
| Pink, very small; stem slender, erect, each joint bearing a glutinous patch. | Seeds... .... | Grain fields, summer fallows. | Summer fallow. |
| Pink, yellow outside, 1-in., solitary; opening at night; whole plant viscid, hairy; calyx tubular 10-ribbed. | " ........ | Fields, gardens ... | Pull, cultivate. |
| Purple, 1-in., solitary; seeds ⅛-in., black, rough. | Seeds in grain. | Grain fields, summer fallows. | Pull, sow clean grain. |
| White, ⅓-in.; each internode with a line of white hairs. | Seeds, in seed and manure, birds. | Gardens, lawns, low ground. | Cultivate early and thoroughly. |
| White, ½-in., hanging; loose panicle calyx inflated, veined; leaves glaucous. | Seeds, root stocks. | Fields and road sides. | Summer fallow, cultivate. |
| Yellow, ¼-in., solitary; stems red, leaves wedge-shaped; whole plant fleshy. | Seeds......... | Gardens and fields | Cultivate *early.* |
| Pinkish, ½-in., solitary............ | " ........ | Roadsides and fields. | Hoe, cultivate. |
| White, ⅓-in., clusters terminal...... | " .... ... | Gardens and fields | Cultivate. |
| White, ½-in.; clusters terminal, leaves linear; stems ascending. | " ........ | Fields, summer fallows. | Summer fallow, cultivate. |
| White, ¼-in.; panicle; leaves thread-like in whorls. | " ........ | Grain fields, sandy land. | Cultivate, constantly. |
| Yellow with black eye, 1-in., open from 10 to 12 a.m., solitary; stems erect, lower branches decumbent. | " ........ | Gardens .......... | Pull, cultivate. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. — Height. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| GERANIUM FAMILY. | | | | | |
| Heron's-bill, Stork's-bill, Alfilaria, Pin-grass. | *Erodium cicutarium*, L'Her., Europe. | Que., B.C. | Annual, 3-12 in., prostrate. | All the year. | Summer.. |
| PEA FAMILY. | | | | | |
| Wild Vetch, Wild Tare. | *Vicia sativa*, L., Europe. | General .. | Annual, 1-2 ft. | July-Aug. | Aug.-Sept |
| Purple Tufted-Vetch | *Vicia cracca*, L., Europe. | Eastern Canada. | Perennial, 1-3 ft. | " .. | " .. |
| Wild Liquorice ..... | *Glycyrrhiza lepidota*, Nutt, native. | Manitoba, N.W.T. | Perennial, 2-3 ft. | July...... | " .. |
| ROSE FAMILY. | | | | | |
| Hard-hack, Steeple bush. | *Spiræa tomentosa*, L., native.. | Que....... | Perennial, 1-4 ft. | July...... | Aug...... |
| Erect Cinquefoil..... | *Potentilla Norvegica*, L., native. | General .. | Annual, winter annual, 6-24 in. | June-July | July-Aug. |
| Silvery " .... | *Potentilla argentea*, L., Europe. | Eastern Canada. | Perennial, 6 in. | June-Sept | July-Sept. |
| Silverweed, Cinquefoil. | *Potentilla anserina*, L., native. | General... | Perennial, 6 in. | " .. | " .. |
| Prairie Rose........ | *Rosa Arkansana*, Porter, native. | Manitoba, N.W.T. | Shrub, 3 in.-3 ft. | June-July | Aug.-Sept |
| STONECROP FAMILY. | | | | | |
| Live-forever ........ | *Sedum Telephium*, L., Europe. | Ont., Que. | Perennial, 1-2 ft | July...... | Sept...... |
| EVENING PRIMROSE FAMILY. | | | | | |
| Glandular Willow-herb. | *Epilobium adenocaulon*, Haussk., native. | General .. | Biennial, 1-3 ft. | July-Aug. | Aug.-Sept |
| Common Evening Primrose. | *Œnothera biennis*, L., native. | " .. | Biennial, 1-4 ft.. | July...... | July-Sept. |
| *White Evening Primrose. | *Œnothera albicaulis*, Nutt, native. | Manitoba, N.W.T. | Perennial, 6 in.-4 ft. | " ...... | Aug.-Sept |
| PARSLEY FAMILY. | | | | | |
| Carrot ............ | *Daucus Carota*, L., Europe. | Ont., Que., Maritime Provinces | Biennial, 1-2 ft. | July-Aug. | Aug.-Sept |
| Caraway........... | *Carum carui*, L., Europe | General . | Biennial, 1-2 ft. | July...... | " .. |
| Spotted Cowbane, Musquash Root, Beaver Poison. | *Cicuta maculata*, L., native. | " .. | Perennial, 2-6 ft. | July-Aug. | Sept...... |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of Propagation and Distribution. | Place of Growth, and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Purple, ½-in., umbel; leaves feathery pinnatifid; styles in fruit elongated, twisting spirally when ripe, bearded inside. | Seeds........ | Gardens, fields.... | Hoe, cultivate .... |
| Purple, ½-in., solitary; ripe pods black; seeds round, ⅛-in., mottled or velvety black. | Seeds, in grain | Fields .. ......... | Summer fallow, hoed crop. |
| Violet and blue, ½-in., spikes long crowded 1-sided, about 30 flowers; pods, light brown; seeds round, ⅛-in., dark brown, mottled. | " in hay.. | Hay fields, fields.. | Plough, hoed crop. |
| Whitish, ½-in., spikes peduncled; pods oblong, ½-in., covered with hooked prickles. | Seeds, pods attached to stock, in hay | Summer fallows, pastures; wool. | Summer fallow early. |
| Rose coloured, small, in dense terminal panicles; leaves below brownish and woolly. | Seeds ...... . | Mountain pastures | Pull and grub out. |
| Yellow, ½-in., leafy cymes; leaves 3-parted; whole plant dark green, hairy. | " ........ | Summer fallows, grain fields. | Summer fallow, cultivate. |
| Yellow, ½-in., stems spreading, ascending, paniculate, many flowered; leaves dark green above, silvery white beneath. | " ........ | Pastures, lawns, hay fields. | Break sod, cultivate |
| Bright yellow, ¾-in., solitary on long stalks. | " runners | Low lands, particularly if alkaline. | Summer fallow, cultivate. |
| Pink to deep rose, 2½-in., corymb... | " rootstocks | Summer fallows, grain fields. | Summer fallow early, harrow, cultivate. |
| Purple, in close compound cymes, 2-3-in. across; whole plant fleshy. | Seeds, portions of stem or root. | Pastures, hay..... | Spud, break sod, cultivate. |
| Purplish, ⅛-in., panicle erect; leaf stalks very short; stem glandular pubescent. | Seeds, wind... | Low land, summer fallows, grain on stubble. | Plough fall or spring, summer fallow early. |
| Yellow, 1½-in., open at night, leafy spike. | " ........ | Summer fallows... | Pull, plough fall and spring. |
| White, turning pink, 2-in., malodorous leafy spikes; buds nodding; stems glistening white, simple, branched at the top. | Seeds and rootstocks. | Grain fields on knolls. | Summer fallow, cultivate thoroughly. |
| White, in umbel, central flower red; umbel 3-in. across, closing in like a bird's nest when mature; seed bristly. | Seeds, carried by animals. | Fields, pastures, road sides. | Break sod, spud. |
| White; umbel 2-in. across; seeds oblong, ribbed, smooth, aromatic. | Seeds ........ | Road sides, pastures. | Spud, mow in flower |
| White; umbel 4-in. across; stem stout, spotted with purple, strong smelling, very poisonous. | Seeds, carried by floods. | Wet meadows, troublesome in hay, poisonous to stock, | " |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. — Height. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| HONEYSUCKLE FAMILY. | | | | | |
| Wolfberry, Western Snow-berry. | *Symphoricarpus occidentalis*, Hook., native. | Manitoba, N.W.T. | Shrub, 2–3 ft. | July...... | Sept...... |
| BEDSTRAW FAMILY. | | | | | |
| Northern Bedstraw . | *Galium boreale*, L., native | " .. | Perennial, 1–2 ft. | July...... | Aug...... |
| SUNFLOWER FAMILY. | | | | | |
| Gumweed.......... | *Grindelia squarrosa*, Dunal, native. | " .. | Biennial, 12–18 in. | July–Aug. | Aug.–Sept |
| Goldenrod......... | *Solidago Canadensis*, L., native. | General .. | Perennial, 2–3 ft. | July...... | " .. |
| Narrow-leaved Goldenrod. | *Solidago lanceolata*, L., native. | " .. | Perennial, 12–18 in. | " ...... | Aug...... |
| Many-flowered Starwort. | *Aster multiflorus*, Ait., native. | Manitoba, N.W.T | Perennial, 12–18 in. | " ...... | " ...... |
| Canada Fleabane, Horse-weed "Fire-weed." | *Erigeron Canadensis*, L., native. | General... | Annual and winter annual, 6 in.–5 ft. | July–Oct.. | Aug.-Oct. |
| Daisy Fleabane..... | *Erigeron annuus*, Pers, native. | " .. | Annual and winter annual, 3 in.-5 ft. | June–Aug | July–Aug. |
| Rough Daisy Fleabane. | *Erigeron trigosus*, Muhl. native. | " .. | Annual and winter annual, 1–2 ft. | " .. | " .. |
| Rosy Fleabane....... | *Erigeron Philadelphicus*, L., native. | " .. | Annual and winter annual, 1–2 ft. | " .. | " .. |
| Plantain-leaved Everlasting. | *Antennaria plantaginifolia*, Hook., native. | " .. | Perennial, prostrate. | May...... | June...... |
| Pearly Everlasting.. | *Anaphalis margaritacea*, Benth. and Hook., Asia | " .. | Perennial, 1–2 ft. | July...... | Aug...... |
| Scented Everlasting. | *Gnaphalium polycephalum*, Michx., native. | Eastern Canada. | Annual, 1–2 ft. | June-July | " ...... |
| Low Cudweed....... | *Gnaphalium uliginosum*, L., native. | General .. | Annual, 4 8 in. | July...... | Aug.–Sept |
| Poverty Weed ...... | *Iva axillaris*, Pursh., native. | Manitoba. N.W.T. | Perennial, 6–12 in. | July–Aug. | ' .. |
| False ragweed, Turkey-foot, marsh elder. | *Iva xanthiifolia*, Nutt., native. | Man...... | Annual, 1–4 ft. | Aug–Sept. | Sept–Oct . |
| *Great ragweed, crownweed, riverweed. | *Ambrosia trifida*, L., native. | " ..... | " .. | July–Sept | Aug–Nov. |
| Ragweed, Roman wormwood, richweed. | *Ambrosia artemisiæfolia*, L., native. | General... | " .. 1–3 ft. | " .. | " .. |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of Propagation and Distribution. | Place of Growth, and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Red, much bearded inside, ⅛-in., dense terminal and axillary spikes; berry reddish, ¼-in. | Seeds and running root-stocks. | Newly broken land, summer fallows and pastures. | Break early, summer fallow. |
| White, small, in large terminal panicles. | " .. | Grain fields, pastures. | Summer fallow, cultivate. |
| Bright yellow; ¾-in.; whole plant glutinous; bud bearing large drop of white resin. | Seeds, wind, in hay. | Fields, pastures, road sides. | Mow, cultivate. |
| Yellow, head large, 1-sided......... | Seeds, running root-stocks, wind. | Grain fields, summer fallows. | Plough and cultivate. |
| Bright yellow; dense cormybs; leaves narrow. | " .. | Low land, fields and pastures. | " |
| White; ¼-in., crowded on spreading branches. | " .. | Grain fields, sandy land. | |
| White; heads very numerous, small, crowded in a slender erect wand-like panicle. | Seeds, wind... | Summer fallows, grain fields. | Summer fallow early, cultivate fall and spring. |
| White, tinged with purple, ½-in.; corymb; leaves coarsely toothed. | Seeds, wind, in hay. | Grain fields, gardens. | Cultivate fall and spring. |
| White; ½-in., panicled corymb; leaves entire or nearly so, rough. | " .. | " .. | " |
| Rose pink; ¾-in., showy, corymb; leaves clasping. | " .. | Low lands, fields, pastures, gardens | " |
| White, ¼-in., a small crowded cluster; flowering stem erect, naked. | Seeds, offsets and runners. | Pastures.......... | Break up sod, cultivate |
| White, ¼-in., many in a terminal corymb; stem leafy, white, downy. | Seeds, running root-stocks, wind. | Meadows and pastures. | " |
| Yellowish white, ⅛-in., terminal clusters; stem leafy; whole plant, fragrant. | Seeds, wind... | " .. | " |
| Inconspicuous; terminal leafy clusters. | Seeds, floods.. | Low ground, fields, meadows and pastures. | Drain thoroughly. |
| Inconspicuous; ⅛-in., hanging, short-stalked in axils of the upper leaves; leaves less than 1-in., rough, oblong linear, entire, opposite below, alternate above. | Copious underground creeping stems. | Grain fields.. ... | Summer fallow, cultivate constantly. |
| Green, ⅛ in., crowded in large terminal panicles; stem smooth. | Seeds, wind, floods. | Grain crops, roadsides. | Pull, mow. |
| Yellow, ⅛ in., sterile flowers in terminal racemes or spikes, fertile flowers axillary at base of spikes; stems rough; seed ¼ in., bearing a crown of 5–6 tubercles above the middle; leaves 3-lobed. | Seeds, in grain, wind, floods. | Low rich land, grain fields, wheat. | Pull, mow, burn old plants. |
| Yellow, ⅛ in., sterile in racemes, fertile green, axillary; seed ⅛ in. long, with 6 short sharp spines; leaves finely cut up. | " .. | Rich cultivated land, all crops. | Cultivate late, mow stubbles. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. Height. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| Perennial ragweed.. | *Ambrosia psilostachya*, D. C., native. | Manitoba, N.W.T. | Perennial, 1–2 ft. | July-Sept. | Aug–Nov. |
| Cocklebur .... ... | *Xanthium strumarium*, L., Europe. | General .. | Annual, 1–2 ft. | June-Sept | Aug Sept. |
| Blackeyed Susan, orange daisy, cone-flower, niggerhead. | *Rudbeckia hirta*, L., native. | " .. | Biennial, 1–2 ft. | June- Aug | " .. |
| Wild sunflower...... | *Helianthus rigidus*, Desf., native. | Manitoba, N.W.T. | Perennial, 1–3 ft. | July- Aug | " .. |
| " ..... | *H. Maximiliani*, Schrad., native. | Manitoba, N.W.T. | Perennial, 1–4 ft. | " . | " .. |
| " ..... | *H. Nuttallii*, T. & G., native. | Manitoba, N.W.T. | " .. | " . | " .. |
| Common beggar-ticks, pitch-forks. | *Bidens frondosa*, L., native. | General .. | Annual, 1–3 ft. | " . | " .. |
| Sneezeweed ... .... | *Helenium autumnale*, L., native. | Manitoba, N.W.T., B.C. | Perennial, 1–3 ft. | Aug Sept | Sept- Oct. |
| Mayweed, dogfennel, stinking chamomile. | *Anthemis Cotula*, L., Europe. | General .. | Annual, 1 ft. | June- Aug | July- Sept |
| Yarrow, milfoil. ... | *Achillea Millefolium*, L., Europe. | " .. | Perennial, 6-18 in. | July- Aug | Aug-Sept. |
| *Ox-eye daisy, white-weed. | *Chrysanthemum Leucanthemum*, L., Europe. | Eastern Canada. | Perennial, 18–24 in. | June- Aug | June-Sept |
| Pasture sage, western mugwort. | *Artemisia Ludoviciana*, Nutt., native. | Prairie Provinces. | Perennial, 1-2 ft. | July - Aug | Aug-Sept. |
| Sweet sage.......... | *Artemisia frigida*, Willd, native. | Prairie Provinces. | Perennial, 12-18 in. | " .. | " .. |
| False Tansy, biennial worm-wood, carrot-top. | *Artemisia biennis*, Willd, native. | General ; Prairie Provinces | Biennial and annual, 1–5 ft. | " .. | " .. |
| Fireweed.......... | *Erecthites hieracifolia*, Raf., native. | General .. | Annual, 1-3 ft. | July- Sept | July -Sept |
| Burdock.......... | *Arctium Lappa*, L., Europe. | " .. | Biennial, 3-4 ft. | " .. | Aug-Oct . |
| Common groundsel.. | *Senecio vulgaris*, L., Europe. | Quebec, Maritime Provinces | Annual, 6-12 in. | " .. | July-Sept |
| *Sinking Billy, baughlan, common ragwort. | *Senecio Jacobæa*, L., Europe. | Maritime Provinces | Perennial, 2 ft. | " .. | Aug- Sept |
| Knapweed, hardheads. | *Centaurea nigra*, L., Europe. | " . | " .. | Aug-Sept. | " .. |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers, and other Characters of the Plant. | Method of propagation and Distribution. | Place of Growth and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Yellow, $\frac{1}{8}$ in., sterile in racemes, fertile green, axillary; seed $\frac{1}{8}$ in long, hairy without spines. Plant grayish-green. | Seeds, running rootstocks. | Rich cultivated land, all crops. | Summer fallow early, cultivate deep. |
| Green, $\frac{1}{4}$ in. in heads; leaves triangular, toothed, rough; seed in a 2-celled prickly bur, $\frac{1}{2}$ in. long with 2 hooked spines at tip. | Seeds. Burs carried by animals. | Low fields, wool... | Mow, burn old plants, cultivate. |
| Orange and purple, 2 in., whole plant very rough. | Seeds, in hay and clover seed. | Meadows, grain fields. | Mow often, spud, summer fallow. |
| Dark yellow rays, disk black 2 in.; heads few, on long purplish stalks. | Seeds, running rootstocks. | New breaking, grain fields. | Summer fallow early, cultivate. |
| Pale yellow rays, disk yellow; heads numerous 3 in., on short leafy stalks up the stem; leaves grayish. | " " | " " | " " |
| Golden yellow, 4 in.; heads few, sweet scented; leaves green. | " " | " " | " " |
| Yellow, $\frac{1}{2}$ in., heads; seeds flat, 2-awned, wedge-shaped; leaves 3–5 divided. | Seeds, carried by animals, floods. | Low land, grain fields. | Drain, cultivate. |
| Yellow, rays 3–5 cleft drooping; disk globular; heads 1 in., in terminal corymbs; leaves decurrent on the stems. | Seeds, rootstocks.. | Low spots in fields, hay. | Drain, spud, break up sod, cultivate. |
| White, $\frac{3}{4}$ in., heads......... | Seeds, in hay and grass seed. | Meadows, roadsides, grain fields. | Mow, seed down, hoed-crop. |
| White, $\frac{1}{8}$ in., in flat heads, 2 inches across; leaves very feathery. | Seeds, offsets...... | Meadows, pastures. | Break up sod, cultivate. |
| White, 1 in., heads... ... . | Seeds, offsets, in grass and clover seed. | Meadows, pastures, cultivated fields. | Break up sod, seed to clover, cultivate. |
| Silvery white, like the whole plant; heads small, numerous in short spikes forming an elongated panicle; bitter, strongly scented. | Seeds, running rootstocks. | Pastures, summer fallows, hay. | Break up sod, summer fallow. |
| As above, but flowers in racemes. | " " | " " | " " |
| Whole plant dark green, the numerous very small flowers in a tall wand-like, leafy panicle. | Seeds, floods...... | Grain fields, particularly on stubble, hay, market value of land. | Plough fall and spring, summer-fallow. |
| Yellowish; elongated panicle. | Seeds, wind....... | Fields, low lands, all crops. | Cultivate, pull, hoe. |
| Purple, $\frac{1}{2}$ in. clustered; leaves very large like rhubarb. | Seeds, carried by animals. | Pastures, road sides rich land, wool, grain. | Spud, mow, burn. |
| Yellow, corymb............. | Seeds, wind. .... | Gardens, fields, all crops. | Hoe, cultivate frequently. |
| Yellow, $\frac{1}{2}$ in., in flat cymes.. | Seeds, offsets, wind. | Pastures, road sides, &c. | Break up sod, spud, mow to prevent seeding. |
| Purple; globular, black outside; stems rough and tough. | Seeds............. | " " | Break up sod, spud. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurions, | Duration | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| *Canada thistle..... | *Cnicus arvensis*, Hoffm., Europe. | General .. | Perennial, 3 ft. | June–Aug | July–Sept |
| Bull-thistle......... | *Cnicus lanceolatus*, Hoffm., Europe. | " .. | Biennial, 3 ft. | July–Aug | July–Aug |
| Western bullthistle, prairie thistle. | *Cnicus undulatus*, Gray, native. | Prairie Provinces | Perennial, 2 ft. | " .. | " .. |
| Chicory............ | *Cichorium Intybus*, L., Europe. | General .. | Perennial, 2–3 ft. | July–Oct. | Aug–Oct. |
| Fall dandelion, hawk bit. | *Leontodon autumnalis*, L., Europe. | Mar. Prov. | Perennial, 6–12 in. | June–Oct. | June–Oct. |
| Dandelion.......... | *Taraxacum officinale*, Webers, Europe. | General .. | Perennial, 2–12 in. | Summer. . | Summer.. |
| *Orange hawkweed, paint brush. | *Hieracium aurantiacum*, L., Europe. | Quebec. . | Perennial, 6–12 in. | June–Aug | June–Sept |
| Skeleton weed..... | *Lygodesmia juncea*, Don., native. | Prairie Provinces. | Perennial, 12 in. | July–Aug | July–Aug |
| *Prickly lettuce..... | *Lactuca Scariola*, L., Europe. | B.C., Ont. | Annual, 3–6 ft. | " .. | July–Sept |
| *Blue lettuce, showy lettuce. | *Lactuca pulchella*, DC., native. | Prairie Provinces. | Perennial, 1–2½ ft. | " .. | " .. |
| *Perennial sow-thistle, field sow-thistle. | *Sonchus arvensis*, L., Europe. | Eastern Canada. | Perennial, 3–4 ft. | July–Sept | July–Oct. |
| Sowthistle, milk thistle. | *Sonchus oleraceus*, L., Europe. | General .. | Annual, 1–2 ft. | Summer.. | Summer.. |
| Spiny sowthistle..... | *Sonchus asper*, Vill., Europe. | " .. | " .. | " .. | " .. |
| LOBELIA FAMILY. | | | | | |
| Indian tobacco...... | *Lobelia inflata*, L., native | Eastern Canada. | Annual, 1 ft. | July–Nov. | Aug.–Nov |
| PRIMROSE FAMILY. | | | | | |
| Sea milkwort..... | *Glaux maritima*, L., native. | Prairie Provinces | Perennial, 6 in. | June..... | July...... |
| DOGBANE FAMILY. | | | | | |
| Spreading dogbane.. | *Apocynum androsæmifolium*, L., native. | General .. | Perennial, 1–2 ft. | July ..... | Sept...... |
| Indian hemp...... | *Apocynum cannabinum*, L., native. | " .. | Perennial, 2–3 ft. | July–Aug. | " ..... |
| MILKWEED FAMILY. | | | | | |
| Common milkweed, silkweed, wild cotton. | *Asclepias Cornuti*, Decaisne, native. | Eastern Canada. | " .. | June–Aug | July–Oct. |
| BORAGE FAMILY. | | | | | |
| Viper's bugloss, blueweed. | *Echium vulgare*, L., Europe. | " .. | Biennial, 6–18 in. | July–Oct. | Aug.–Oct. |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of Propagation and Distribution. | Place of Growth and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Lilac; ¾ in.; running rootstocks. | Seeds, wind...... | Fields, grain, pastures, all crops. | Mow in July and September and cultivate frequently. |
| Purple; 2 in.... ......... | " ...... | Fields, meadows, grain, hay. | Spud, cultivate, mow. |
| Lilac purple, 2 in.; whole plant grayish. | " ...... | Road sides, summer fallows. | Summer-fallow. |
| Bright blue; 1½ in.; almost leafless stems. | Seeds, floods...... | Fields, road sides.. | Plough, cultivate. |
| Yellow; ¾ in.; down of seeds tawny. | Seeds, wind....... | Gardens, pastures, roadsides. | Break up sod, hoe. |
| Yellow; 1½ in......... ..... | " ...... | Pastures, lawns, gardens. | Spud. |
| Orange red or yellow; ½ in., terminal clusters; running root stocks. | Seeds, running rootstocks, in clover seed, and hay, wind. | Mountain pastures, meadows, fields. | Salt broad casted 1½ tons to the acre on grass land, cultivate. |
| Pink; ½ in., solitary; exuding milky juice when cut, stems much branched, almost leafless. | Seeds, running rootstocks. | Grain fields.. .... | Summer-fallow, cultivate. |
| Yellow; ¼ in.; panicle. .. .. | Seeds, wind....... | Fields, all crops... | Cultivate, hoe, mow and burn. |
| Blue; ¾ in., few; loose panicle; glaucous. | Seeds, deep running rootstocks. | Grain fields, especially on slightly alkaline lands. | Plough deep, cultivate. |
| Yellow; 1½ in., 3 or 4 at the top of a leafless stem; foot stalks covered with soft glandular hairs; running root stocks. | Seeds, wind, running rootstocks. | Fields, all crops... Plough, hoe crop.. | Pull when in bloom, plough, hoe crop. |
| Pale yellow; ½ in.; corymb; leaves heart-shaped at base, with many soft spines and two sharp auricles. | Seeds, wind....... | Gardens, all crops in rich land. | Hoe, pull. |
| Pale yellow; ½ in. corymb; leaves less divided, more prickly the auricles at the base rounded. | " ...... | " " .. | " " |
| Blue, ¼ in., racemes; pods inflated. | Seeds, in hay and grass seeds. | Meadows, pastures, grain fields; poisonous. | Pull, cultivate, hoe. |
| Pink, ⅙ in.... ......... .... | Seeds, rootstocks.. | Meadows, wet fields on alkaline lands. | Summer fallow, cultivate. |
| Pink, ¼ in., bell-shaped, hanging, cyme; seed pods 3 in. long, in pairs; stems red, juice milky. | Seeds, running root stocks, wind. | Fields, summer fallows. | " " |
| White, ⅛ in., erect; cyme; juice milky. | " " .. | Fields, moist grounds. | " " |
| Pinkish, ½ in., umbels....... | Seeds, running root stocks, wind. | Rich soil, all crops. | Mow while in bloom, plough, hoed crops. |
| Blue, ½ in., buds red; raceme of short lateral clusters; stem and leaves rough, bristly. | Seeds............ | Roadsides, fields.. | Spud, cultivate. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| CONVOLVULUS—*Con.* | | | | | |
| Small bugloss....... | *Lycopsis arvensis*, L., Europe. | Maritime Provinces | Annual, 6-12 in. | July-Oct. | Aug.-Oct. |
| Corn gromwell, wheat thief, pigeon-weed. | *Lithospermum arvense*, L., Europe. | Eastern Canada. | " .. | June-Aug | July-Sept |
| Blue bur, stick-seed. | *Echinospermum Lappula*, Lehm., Europe. | General .. | Annual and winter ann. 1 ft. | " | " |
| Burs, Common hound's-tongue. | *Cynoglossum officinale*, L., Europe. | " .. | Biennial, 1-2 ft. | " | " |
| CONVOLVULUS FAMILY. | | | | | |
| *Bindweed ......... | *Convolvulus arvensis*, L., Europe. | " .. | Perennial, climber. | June-Sept | Aug.-Nov |
| Morning-glory, bracted bind-weed. | *Convolvulus sepium*, R. Br., native. | Man. .... | " .. | " | Aug.-Sept |
| Clover dodder, devil's gut. | *Cuscuta epithymum*, Murr., Europe. | " .. | Annual, climber. | June-Nov | July-Nov. |
| NIGHTSHADE FAMILY | | | | | |
| Common nightshade. | *Solanum nigrum*, L., Europe. | " .. | Annual, 6 in. | June-Sept | July-Oct. |
| Thorn apple ........ | *Datura Stramonium*, L., Asia. | " . | Annual, 2-4 ft. | July-Oct. | Sept.-Oct. |
| FIGWORT FAMILY. | | | | | |
| Mullein ............ | *Verbascum Thapsus*, L., Europe. | " .. | Biennial, 3-6 ft. | July-Sept | Aug.-Nov |
| Moth mullein....... | *Verbascum Blattaria*, L., Europe. | Eastern Canada. | 2 or 3 years, 3 ft. | June-Sept | July-Nov. |
| Toad-flax, butter and eggs, ramsted. | *Linaria vulgaris*, Mill., Europe. | " .. | Perennial, 1 ft. | July-Oct. | Aug.-Nov |
| Neckweed, purslane speedwell. | *Veronica peregrina*, L., native. | General .. | Annual and wint. ann., 4-9 in. | May-July | June-Aug |
| Thyme-leaved speedwell. | *Veronica serpyllifolia*, L., native. | " .. | Perennial, creeping, stems ascending. | " | " |
| Yellow rattle....... | *Rhinanthus Crista-galli*, L., native and introduced. | Eastern Canada and B.C. | Annual, 6-12 in. | July...... | July-Aug |
| VERVAIN FAMILY. | | | | | |
| Blue vervain, Simpler's joy. | *Verbena hastata*, L., native. | General .. | Perennial, 2-3 ft. | June-Sept | Aug.-Oct. |
| White vervain, nettle-leaved vervain. | *Verbena urticifolia*, L., native. | Eastern Canada. | " .. | " | " |
| MINT FAMILY. | | | | | |
| Wild bergamot...... | *Monarda fistulosa* (and var. *mollis*), L., native | Prairie Provinces, Ontario. | Perennial, 2 ft. | July-Aug. | Aug. ..... |
| Dragon-head ...... | *Dracocephalum parviflorum*, Nutt., native. | General .. | Annual, 12-18 in. | June-Aug | July-Aug |
| Heal-all, self-heal ... | *Brunella vulgaris*, L., Europe. | " .. | Perennial, 4-8 in. | June-Sept | July-Sept |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of propagation and Distribution. | Place of Growth and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Blue, ¼ in., axillary; very rough-bristly. | Seeds...... . .... | Cultivated land... | Hoe, cultivate. |
| Whitish, ⅛ in., axillary...... | Seeds, in grain ... | Grain fields....... | Sow clean seed, plough stubble early |
| Blue, ⅜ in., axillary, on leafy racemes. | Seeds, carried by animals. | Grain fields, roadsides, wool. | Summer fallow, cultivate. |
| Reddish purple, ¼ in., racemes | " " .. | " " .. | Spud, mow. |
| Pink, 1 in., solitary; flowering very sparsely. | Seeds, in grain, long root stocks. | Fields, all crops... | Plough, cultivate frequently. |
| Pink or white, 2 in., solitary. | Seeds, running root stocks. | Fields............ | Cultivate frequently. |
| Whitish, ⅛ in., clusters along orange stem. | Seeds, in clover and alfalfa seed. | Clover and alfalfa fields. | Use clean seed, mow patches before seeds ripen. |
| White or lilac, ¼ in., umbel-like clusters. | Seeds...... ...... | Fields, gardens, all crops. | Cultivate, hoe. |
| White, 2 in., solitary; plant green. | " ............ | Waste places; poisonous. | Mow, hoe. |
| Yellow, ⅜ in., spike; leaves velvety white. | Seeds, in hay and clover seed. | Meadows, pastures. | Spud, plough, cultivate. |
| Yellow or white, 1 in., raceme; leaves smooth. | " " .. | " " .. | Spud, break up sod. |
| Yellow, ½ in., racemes; unpleasant odour. | Root-stocks, seeds in grass seeds. | Pastures, roadsides | Break up sod, cultivate, seed heavily to clover. |
| Blue, ⅛ in., axillary on spikes. | Seeds............ | Low land......... | Cultivate. |
| " " .. | " ...... .... | Low lands, lawns.. | Cultivate, break up sod. |
| Yellow, ½ in., spike; calyx membranaceous, much enlarged in fruit. | Seeds, in hay...... | Meadows in low land. | Mow early. |
| Purple, ⅛ in., corymbed spikes | Seeds, root stocks. | Low ground, summer fallows, pastures. | Mow, summer fallow, plough. |
| White, $\frac{1}{12}$ in., spikes........ | " " .. | " " .. | " " |
| Purplish, 1 in., whorled heads, strongly scented. | Seeds, running root stocks. | Summer fallows, newly cleared land | Summer fallow early, cultivate. |
| Lilac, ¼ in., terminal spikes . | Seeds............ | Summer fallows, grain crops. | Summer fallow early. |
| Violet, ½ in.; spike of axillary 3-flowered clusters. | Runners, seeds.... | Pastures, lawns... | Break up sod. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| Hemp-nettle .. . . .. | *Galeopsis Tetrahit*, L., Europe. | General .. | Annual, 1–3 ft. | July–Sept | July-Sept. |
| PLANTAIN FAMILY. | | | | | |
| Common plantain... | *Plantago major*, L., native and Europe. | " .. | Perennial, 6–18 in. | June-Sept | " |
| Pale plantain ....... | *Plantago Rugellii*, Decaisne, native. | " .. | " .. | " | " |
| Rib grass, black plantain, ripple grass.. | *Plantago lanceolata*, L., Europe. | " .. | " .. | " | " |
| GOOSEFOOT FAMILY. | | | | | |
| Lamb's quarters, pigweed, goosefoot, fat-hen. | *Chenopodium album*, L., Europe and native. | " .. | Annual, 1–3 ft. | June-Nov. | Aug-Nov. |
| Maple-leaved goosefoot. | *Chenopodium hybridum*, L., Europe. | " .. | Annual, 1–5 ft. | July-Nov. | " |
| Bugseed. ......... | *Corispermum hyssopifolium*, L., native. | Prairie Provinces | Annual, Spreading. | Aug–Oct. | Sept-Oct. |
| *Russian tumble-weed, Russian thistle. | *Salsola kali*, L., var. *Tragus*, Russia. | Southern Manitoba. | Annual, 1-3 ft. | July-Sept. | Aug-Nov. |
| *Russian pigweed... | *Axyris amarantoides*, L., Russia. | Manitoba. | Annual, 1–4 ft. | " | " |
| AMARANTH FAMILY. | | | | | |
| Pigweed, redroot, Chinaman's greens. | *Amarantus retroflexus*, L., Tropical America. | General .. | Annual, 1–3 ft. | " | " |
| Tumble-weed, white pigweed. | *Amarantus albus*, L., Tropical America. | " .. | Annual, prostrate or ascending. | July-Sept. | Aug-Sept. |
| Spreading amaranth, fleshy amaranth, low amaranth. | *Amarantus blitoides*, Watson, native. | Prairie Provinces, Ontario. | " .. | " | " |
| BUCKWHEAT FAMILY. | | | | | |
| Nodding knotweed, tall persicary. | *Polygonum lapathifolium*, Ait, native. | General .. | Annual, 1–4 ft. | July-Sept. | Aug-Sept. |
| Lady's thumb, persicary. | *Polygonum Persicaria*, L., Europe. | " .. | Annual, 12–18 in., ascending. | " | " |
| Knotgrass, goosegrass, door-weed. | *Polygonum aviculare*, L., native, Europe. | " .. | Annual, 12–18 in., prostrate. | " | July-Sept. |
| Erect goosegrass, whiteman's footstep | *Polygonum erectum*, L., native. | Prairie Provinces, Ontario. | Annual, 6-10 in. | " | " |
| Wild buckwheat, black bind-weed. | *Polygonum convolvulus*, L., Europe. | General .. | Annual, climber. | " | " |
| White dock........ | *Rumex salicifolius*, Weinm, native. | Prairie Provinces. | Perennial, 1–3 ft. | July-Aug. | Aug-Sept. |
| Curled dock, sour dock, yellow dock. | *Rumex crispus*, L., Europe. | General .. | Perennial, 1–3 ft. | " | " |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of propagation and Distribution. | Place of Growth and Products Injured. | Methods of Eradication. |
|---|---|---|---|
| Purplish, $\frac{1}{2}$ in., axillary whorls; stems swollen below joints; bristly. | Seeds............ | Rich land, all crops | Hoe, pull, cultivate. |
| Spikes dense; pods 7-16 seeded; leaves inclined to lie down. | " ............ | Meadows, pastures, lawns. | Break up sod, spud. |
| Spikes slender, less crowded than in above; pods 4 seeded; leaves erect, pale yellowish green, purple at base. | Seeds, in clover and grass seeds. | Low meadows..... | Break up sod, plough. |
| Spike thick and dense; black anthers; white pods, 2-seeded; seeds boat-shaped. | Seeds, in hay and in grass and clover seeds. | Meadows, pastures, lawns. | " " |
| Green, $\frac{1}{15}$ in., panicle; whole plant mealy white. | Seeds, in grain, clover and grass seed. | Rich soil, all crops. | Cultivate. |
| Green, $\frac{1}{12}$ in., widely branched panicle; whole plant green, smooth. | Seeds, in grain, clover and grass seed. | " | " |
| Green, $\frac{1}{8}$ in., spikes; a tumble weed. | Seeds, wind....... | Sandy fields, all crops. | Summer fallow, cultivate, burn. |
| Purplish, $\frac{1}{4}$ in., axillary; a tumble weed. | Seeds, wind, floods. | Fields, railway banks, all crops. | Hoe, cultivate, burn. |
| Green, $\frac{1}{16}$ in., male flowers in terminal spikes, female axillary. | " | Fields, railway banks, all crops. | " |
| Green, $\frac{1}{12}$ in., panicle of crowded spikes; root pink. | Seeds, in grain and grass seed, wind. | Rich land, everywhere. | Cultivate late, burn. |
| Green, $\frac{1}{12}$ in., spikes along the whitish stems; a tumble weed. | Seeds, in grain and grass seed, wind. | Rich land, everywhere. | " |
| Green, $\frac{1}{12}$ in., spikes along the reddish fleshy stems; seeds twice the size of the preceding. | Seeds, in grain and grass seed, wind. | Rich land, where there is some alkali. | " |
| Pink, $\frac{1}{8}$ in., spikes drooping the stalks rough, with scattered glands. | Seeds, floods..... | Rich lowland, grain and other crops. | Hoe, pull, cultivate. |
| Pink, $\frac{1}{8}$ in., spikes oblong, erect on smooth stalks; leaves with a black blotch. | " | Rich lowland, grain and other crops. | " |
| Pink $\frac{1}{12}$ in., axillary along the stems. | " | Rich lowland, grain and other crops. | Hoe, cultivate. |
| Pink and green, $\frac{1}{12}$ in., axillary along the stems. | " | Rich lowland, grain and other crops. | " |
| White, $\frac{1}{12}$ in., racemes ...... | Seeds, in grain . | Grain fields, summer-fallows. | Summer fallow early, cultivate. |
| Green, $\frac{1}{4}$ in., panicle; seed valves with conspicuous white grains; leaves not waved, pale green. | Seeds, in hay in clover and grass seeds, wind. | Summer fallows, low fields, pastures. | Summer fallow, spud, cultivate. |
| Green, $\frac{1}{4}$ in., panicle; leaves waved at margin. | Seeds, in hay in clover and grass seeds, wind. | Cultivated waste land, pastures. | Spud, plough. |

A LIST of the more prominent Canadian

| Common Name. | Botanical Name, Origin. | Where Injurious. | Duration. | Time of Flowering | Time of Seeding. |
|---|---|---|---|---|---|
| BUCKWHEAT—*Con.* | | | | | |
| Sheep sorrel, sour grass, sour weed. | *Rumex acetosella*, L., Europe. | General.. | Perennial, 6–12 in. | May-Oct. | June-Nov. |
| OLEASTER FAMILY. | | | | | |
| Wolf willow, silver-berry. | *Elæagnus argentea*, Nutt., native. | Prairie Provinces. | Shrub, 2-6 ft. | June...... | August... |
| SPURGE FAMILY. | | | | | |
| Spotted spurge, milk purslane. | *Euphorbia maculata*, L., native. | General .. | Annual, prostrate. | July-Sept. | Aug-Sept. |
| Sun spurge, milk-wort. | *Euphorbia Helioscopia*, L., Europe. | Eastern Canada, B.C. | Annual, 6–18 in. | June-Oct. | July-Oct . |
| NETTLE FAMILY. | | | | | |
| Slender nettle....... | *Urtica gracilis*, Ait., native. | Eastern Canada. | Perennial, 2–6 ft. | June-Sept | July-Nov. |
| GRASS FAMILY. | | | | | |
| Fool's hay, hair-grass. | *Agrostis scabra*, Willd., native. | General .. | Annual, 1–2 ft. | July...... | July Aug. |
| *Spear grass, porcupine grass. | *Stipa spartea*, Trin., native. | Prairie Provinces. | Perennial, 12–18 in. | July 1–15. | July 10–20 |
| *Chess ........... | *Bromus secalinus*, L., Europe. | General .. | Winter annual, 1½–3ft. | June ..... | July..... |
| Couch, quack, skutch, twitch, devil's grass | *Agropyrum repens*, L., Europe and native. | " .. | Perennial, 1½–3 ft. | June–July | Aug-Sept. |
| *Skunk grass, skunk tail grass, squirrel tail grass, wild barley, alkali grass. | *Hordeum jubatum*, L., native. | Prairie Provinces. | Annual, and perennial, 6–12 in. | July-Oct . | July-Oct . |
| White-top, old fog.. | *Danthonia spicata*, Beauv., native. | Maritime Provinces, Quebec. | Perennial, 6–12 in. | June-July | July-Aug. |
| *Wild oats.......... | *Avena fatua*, L. (and *A. strigosa*), Europe. | General .. | Annual, 2–3 ft. | July...... | " |
| *Sweet grass, Indian hay, holy grass. | *Hierochloa borealis*, R. & S., native. | Manitoba, N.W.T. | Perennial, 12–15 in. | May ..... | June...... |
| Old witch grass..... | *Panicum capillare*, L., native. | General .. | Annual, 12–18 in. | July-Aug. | July-Aug. |
| Green foxtail, bottle grass, pigeon grass. | *Setaria viridis*, Beauv., Europe. | " .. | Annual, 1–2 ft. | July-Sept. | Aug-Oct . |
| Yellow foxtail ..... | *Setaria glauca*, Beauv., Europe. | " .. | Annual, 1 ft. ascending. | " | " |
| FERNS. | | | | | |
| Western brake, bracken. | *Pteris aquilina*, L., var. *lanuginosa*, Bong., native. | British Columbia. | Perennial, 3–8 ft. | Summer.. | Summer. |
| Scented fern, brakes. | *Dicksonia pilosiuscula*, Willd., native. | Quebec... | Perennial, 1–2 ft. | " | " |

Weeds, with their chief characters—*Continued.*

| Colour, Size, Arrangement of Flowers and other Characters of the Plant. | Method of propagation and Distribution. | Place of Growth and Products Injured. | Method of Eradication. |
|---|---|---|---|
| Red, $\frac{1}{8}$ in., panicle ......... | Runningrootstocks seed, in clover seed. | Meadows, worn-out pastures, sandy land. | Break up sod, fertilize, re-seed. |
| Yellow, $\frac{1}{6}$ in., very fragrant. | Seeds, running roots. | Pastures......... | Break early, cultivate |
| Red, $\frac{1}{12}$ in., dense leafy axillary clusters. | Seeds............ | Sandy land, gardens, all crops. | Cultivate, seed down. |
| Yellowish, cyme; pod smooth | " ......... ... | Gardens, fields, all crops. | Hoe, cultivate. |
| Green, $\frac{1}{12}$ in., panicle....... | Seeds, running rootstocks. | Low land, pastures, fence-rows. | Mow frequently. |
| Panicle very loose, purplish; leaves very short. | Seeds, wind...... | Summer-fallows .. | Summer fallow early. |
| Panicle contracted, awns, 4-6 inches long, blackish. | Seeds, carried by animals. | Prairie, seeding freely in wet seasons. | Break up prairie. |
| Spikelets dark green....... | Seeds, in grain.... | Fall wheat and rye | Sow clean seed. |
| Spikes........... ....... | Seeds, rootstocks carried by cultivating implements | Fields, all crops... | Plough shallow in summer, hoed crops |
| Pale green, sometimes purpled by cold weather; spikes; flowers long-awned (2 in.) | Seeds, wind, animals. | Meadows, pastures, the barbed seeds injuring stock when eaten. | Mow, burn, break land. |
| Panicle simple; leaves short, gray, curled. | Seeds............ | Pastures and meadows. | Break up sod. |
| Seed hairy and bearing a long twisted awn. | Seeds, in seed grain | Fields, grain crops. | Seed down with early barley or oats and cut for hay, follow with rape or millet. |
| Spikelets brown; whole plant sweetly scented. | Seeds, running rootstocks. | Fields, all crops... | Plough deep, cultivate often. |
| Panicle large, loose and very compound; sheaths and leaves very hairy. | Seeds, wind. .... | Cultivated land, all crops. | Hoe, cultivate. |
| Spike nearly cylindical, green. | Seeds, in clover and grass seeds. | Cultivated land, all crops. | Hoe, pull, cultivate. |
| Spike cylindrical; stems more spreading, seeds larger than in last. | Seeds, in clover and grass seeds. | Cultivated land, all crops. | " |
| Fronds very large; white-downy beneath. | Spores, running rootstocks. | Newly cleared land | Grub and plough early in spring, harrow, cultivate. |
| Forming large beds which rapidly encroach on pastures. | Spores, running rootstock. | Mountain pastures | Break up sod. |

# INDEX.

## *ERRATA.*

On page 23, line 18 from bottom, read above, instead of No. 13.

" 24, transfer Mouse-ear Chickweed, Field Chickweed, and Corn Spurry to the Pink Family above.

" line 8, from bottom, read Field Chickweed,

" " 4 " Corn Spurry.

" " 2 " Bladder Ketmia.

" 28 " 29, from top, read *Erigeron strigosus.*

" 30 " 12, from bottom, read *Erechtites.*

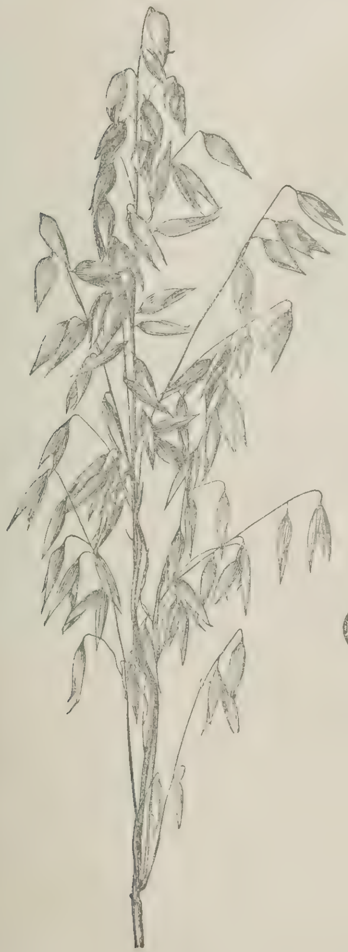
" " 5 " Stinking Billy or Stinking Willie.

" 34 " 5, from top, read Borage Family—*Con.*, for Convolvulus—*Con.*

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA



RESULTS OBTAINED IN 1897

FROM

# TRIAL PLOTS

OF

# GRAIN, FODDER CORN, AND ROOTS

BULLETIN No. 29

JANUARY, 1898

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE.

To the Honourable
The Minister of Agriculture.

SIR,—I have the honour to submit for your approval, bulletin 29 of the Experimental Farm series, prepared by myself. In this bulletin will be found the results of a large number of experiments which have been carried on at all the experimental farms during the season of 1897, with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots and potatoes, in uniform plots. The average results are also given of three years' tests of the uniform plots of oats, barley, spring wheat and potatoes. This work has been undertaken with the object of gaining information as to the relative productiveness and earliness of the many varieties under test. The results show wide variations in the weight of the crops grown and point to the importance of greater care being exercised by farmers in choosing varieties of seed for sowing.

I trust that the information given, covering the experience gained under many of the more important climatic variations found in the Dominion, will be useful to farmers everywhere throughout Canada.

I have the honour to be,
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, 10th January, 1898.

VIEW OF SOME OF THE UNIFORM TEST PLOTS OF GRAIN, 1897, AT THE CENTRAL EXPERIMENTAL FARM.

# RESULTS OBTAINED IN 1897

FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN, AND ROOTS

BY WILLIAM SAUNDERS, LL.D., F.R.S.C., F.L.S., &c.

*Director Experimental Farms.*

In March, 1896, and in January, 1897, bulletins were published giving accounts of the crops obtained in 1895 and 1896, from a large number of test plots of many varieties of oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots and potatoes grown at each of the experimental farms. During the season of 1897, similar lines of work have been conducted, and the crops which have been harvested are reported in the present bulletin. It is hoped that by the prompt issue of the results of these important tests in a form convenient for reference, the farmers of Canada may be able to gain information which will be useful to them in the selection of varieties for sowing during the coming season.

In these experiments the important crops named have been grown on blocks of lands selected so as to be as nearly uniform as possible in character, each having an area sufficient to include all the varieties of one sort of grain, and these have been arranged in plots of one-tenth or one-twentieth acre each, side by side, and usually all sown on the same day or within two days. The seed sown has been uniform in character, and the quantity of seed used per acre and the manner of sowing or planting has been the same.

These experiments have been undertaken for the purpose of gaining information as to the relative productiveness, when grown under similar conditions, of the many varieties in cultivation of these valuable farm crops, also to ascertain their periods of ripening in the different climates of this country.

Particulars are here submitted of the crops produced at each of the experimental farms from all the varieties sown, also the average yield obtained at all these farms. The time required for the maturing of the different sorts is also given, and they are arranged in every case in the order of their productiveness at the Central Experimental Farm at Ottawa.

At the Central Farm, owing to unfavourable weather before and during the harvest time, most of the cereals suffered much from rust, which materially reduced the weight of the crops, and the returns are lower than usual. At the branch farm at Nappan, N.S., the weather in the spring was unusually wet, which delayed seeding and shortened the season for growth. Nevertheless most of the crops of cereals there were well up to the average. At the branch farm at Brandon the season was unusually dry; the rainfall was only about half of the usual quantity. Cereals also were more or less injured by spring frosts and strong winds. Oats suffered most from these unfavourable conditions, some of the varieties sown were entirely destroyed, and others much reduced in yield. On this account some of the best sorts which have heretofore been near the head of the list as most productive, have fallen much behind, and the results at Brandon this season cannot be taken as a fair index of the relative productiveness of the different varieties under trial. The returns from the plots of wheat, barley and pease were well up to, if not above, the average. The yield of fodder crops and roots has been light.

At the branch farm at Indian Head, N.W.T., cereals also suffered from drought and winds in the spring, and some varieties, especially oats, were much injured, but a copious rainfall about the middle of June produced a rapid growth and development and resulted in good crops of most of the cereals, many of them much above the average. The yield of roots and fodder crops was small. At the branch farm at Agassiz, B. C., the weather was favourable to growth throughout the season and crops of all sorts were good.

## OATS.

Sixty-three varieties of oats have been tested during the season of 1897. These include ten of the cross-bred sorts which have been produced at the experimental farms, namely: Medal, Miller, Master, Russell, Olive, Brandon, King, Pense, Oxford and Cromwell. The size of the plots on which they were grown was one-tenth of an acre each at Brandon, Man., and at Indian Head, N.W.T., and one twentieth of an acre each at Ottawa, Ont., Nappan, N.S. and Agassiz, B.C. The quantity of seed sown of each variety was in the proportion of two bushels per acre, and the dates of sowing were the following:—Ottawa, 5th and 6th May; Nappan, 12th to 20th May; Brandon, 1st May; Indian Head, 3rd May, and at Agassiz, 16th April. The average crop of all these varieties of oats at each of the experimental farms was as follows:—At Ottawa, 39 bush. 23 lbs. per acre; Nappan, 59 bush. 5 lbs.; Brandon, 46 bush. 32 lbs.; Indian Head, 71 bush.; and at Agassiz, 67 bush. 29 lbs. per acre. The average return given by the whole of the varieties at all the farms was 56 bush. 31 lbs. per acre. Particulars as to the character of the land in each case, also its preparation and treatment will be found in the Annual Report of the Experimental Farms for 1897.

## UNIFORM TEST PLOTS OF OATS.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1897. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Brandon, Man. Bush. | Brandon, Man. Lbs. | Indian Head, N.W.T. Bush. | Indian Head, N.W.T. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of all Farms. Bush. | Average of all Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Brandon, Man. Days. | Indian Head, N.W.T. Days. | Agassiz, B.C. Days. | Average of all Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Golden Giant... | 57 | 12 | 53 | 18 | .. | .. | 80 | 10 | 89 | 14 | 70 | 5 | 103 | 117 | .... | 119 | 116 | 114 |
| 2 | Mennonite ..... | 56 | 11 | 67 | 2 | .. | .. | 80 | .. | 57 | 32 | 65 | 11 | 91 | 104 | .... | 119 | 107 | 105 |
| 3 | Imp'd. American. | 53 | 28 | 72 | 12 | .. | .. | 86 | 26 | 77 | 22 | 72 | 22 | 93 | 109 | .... | 119 | 121 | 110 |
| 4 | Early Etampes .. | 53 | 23 | 67 | 2 | 56 | 6 | 71 | 16 | 66 | 16 | 62 | 33 | 94 | 115 | 116 | 112 | 119 | 111 |
| 5 | White Schonen.. | 53 | 8 | 59 | .. | 50 | 10 | 72 | 2 | 68 | 28 | 58 | 30 | 93 | 106 | 120 | 117 | 109 | 109 |
| 6 | Ey. Golden Prol. | 50 | 30 | 51 | 26 | 76 | 26 | 80 | 10 | 65 | 10 | 65 | .. | 93 | 107 | 109 | 112 | 119 | 108 |
| 7 | White Russian .. | 50 | 30 | 73 | 18 | 35 | 30 | 71 | 12 | 70 | .. | 60 | 11 | 92 | 106 | 116 | 109 | 109 | 106 |
| 8 | Columbus........ | 49 | 29 | 67 | 2 | 52 | 12 | 85 | 30 | 73 | 18 | 65 | 11 | 92 | 107 | 116 | 109 | 109 | 107 |
| 9 | Wallis ... ..... | 49 | 9 | 87 | 22 | 39 | 4 | 73 | 28 | 69 | 4 | 63 | 27 | 93 | 98 | 116 | 117 | 121 | 109 |
| 10 | Joanette ........ | 49 | 4 | 50 | .. | 71 | 16 | 56 | 16 | 61 | 16 | 57 | 24 | 93 | 115 | 112 | 112 | 119 | 110 |
| 11 | Amer. Triumph.. | 49 | 3 | 44 | 4 | .. | .. | 59 | 24 | 69 | 24 | 55 | 22 | 92 | 107 | .... | 109 | 119 | 107 |
| 12 | Wide Awake.... | 48 | 23 | 61 | 26 | 18 | 18 | 74 | 14 | 73 | 18 | 55 | 13 | 94 | 106 | 116 | 109 | 122 | 109 |
| 13 | Banner ......... | 47 | 7 | 60 | .. | 53 | 8 | 52 | 2 | 64 | 4 | 55 | 11 | 96 | 107 | 110 | 117 | 117 | 109 |
| 14 | Golden Beauty .. | 47 | 7 | 61 | 26 | 57 | 12 | 61 | 16 | 66 | 26 | 58 | 31 | 92 | 107 | 111 | 109 | 119 | 108 |
| 15 | Lincoln.......... | 46 | 6 | 64 | 24 | 37 | 12 | 73 | 28 | 87 | 22 | 61 | 32 | 94 | 98 | 116 | 109 | 110 | 105 |
| 16 | Bonanza ........ | 45 | 30 | 52 | 32 | .. | .. | 67 | 12 | 71 | 26 | 59 | 16 | 90 | 107 | .... | 106 | 117 | 105 |
| 17 | Abundance ...... | 45 | 15 | 53 | 18 | 38 | 28 | 62 | 22 | 52 | 22 | 50 | 21 | 93 | 99 | 116 | 117 | 121 | 109 |
| 18 | American Beauty | 45 | 10 | 64 | 24 | .. | .. | 75 | 30 | 74 | 24 | 65 | 5 | 92 | 105 | .... | 109 | 119 | 106 |
| 19 | Buckbee's Illinois | 44 | 24 | 44 | 4 | .. | .. | 79 | 4 | 76 | 16 | 61 | 3 | 96 | 110 | .... | 117 | 120 | 111 |
| 20 | Medal........... | 44 | 14 | 52 | 32 | 31 | 16 | 73 | 28 | 62 | 2 | 52 | 32 | 91 | 107 | 117 | 119 | 117 | 111 |
| 21 | Siberian O.A.C.. | 44 | 14 | 82 | 12 | 57 | 2 | 86 | 16 | 60 | 10 | 66 | 4 | 96 | 109 | 116 | 109 | 122 | 110 |
| 22 | Miller ..... .... | 43 | 33 | 45 | 30 | 48 | 8 | 73 | 8 | 68 | 18 | 55 | 33 | 96 | 107 | 110 | 119 | 117 | 110 |
| 23 | Scottish Chief.... | 43 | 28 | 47 | 22 | .. | .. | 67 | 12 | 73 | 18 | 58 | 3 | 90 | 107 | ... | 109 | 122 | 107 |
| 24 | Holstein Prolific. | 43 | 28 | 55 | 30 | 55 | .. | 80 | .. | 62 | 22 | 59 | 16 | 94 | 107 | 111 | 112 | 121 | 109 |
| 25 | Victoria Prize... | 43 | 18 | 44 | 4 | 52 | 2 | 59 | 10 | 52 | 32 | 48 | 18 | 90 | 110 | 109 | 117 | 107 | 107 |
| 26 | Improved Ligowo | 42 | 17 | 57 | 22 | 47 | 12 | 73 | 32 | 63 | 18 | 56 | 34 | 94 | 107 | 116 | 109 | 117 | 108 |
| 27 | Master.... .... | 42 | 12 | 59 | 14 | 44 | 14 | 68 | 18 | 52 | 12 | 53 | 14 | 93 | 98 | 116 | 117 | 116 | 108 |
| 28 | Hazlett's Seizure. | 42 | 12 | 78 | 22 | 32 | 22 | 82 | 12 | 68 | 28 | 60 | 33 | 96 | 93 | 115 | 109 | 117 | 106 |
| 29 | Welcome. ..... | 41 | 16 | 61 | 26 | 35 | .. | 71 | 12 | 66 | 12 | 55 | 6 | 90 | 106 | 104 | 105 | 119 | 105 |
| 30 | White Wonder .. | 40 | 25 | 76 | 16 | .. | .. | 66 | 6 | 58 | 18 | 60 | 16 | 96 | 93 | .... | 106 | 121 | 103 |
| 31 | Early Gothland .. | 40 | 10 | 64 | 4 | .. | .. | 82 | 12 | 62 | 12 | 62 | 9 | 92 | 99 | ... | 109 | 119 | 105 |
| 32 | Siberian ........ | 40 | 5 | 52 | 32 | .. | .. | 65 | 26 | 67 | 22 | 56 | 20 | 103 | 109 | .... | 119 | 124 | 114 |
| 33 | Bavarian....... | 39 | 9 | 72 | 12 | .. | .. | 72 | 2 | 75 | 30 | 64 | 30 | 96 | 99 | .... | 109 | 121 | 106 |
| 34 | Russell ....... .. | 39 | 4 | 48 | 28 | 62 | 22 | 69 | 4 | 59 | 14 | 55 | 28 | 94 | 99 | 109 | 112 | 121 | 107 |
| 35 | Olive...... ..... | 38 | 23 | 60 | .. | .. | .. | 85 | .. | 65 | 10 | 62 | 8 | 94 | 107 | .... | 119 | 121 | 110 |
| 36 | Brandon ...... . | 38 | 13 | 48 | 28 | .. | .. | 52 | 12 | 68 | 8 | 51 | 32 | 96 | 103 | .... | 117 | 117 | 108 |
| 37 | Prize Cluster.... | 37 | 7 | 61 | 26 | 56 | 6 | 69 | 14 | 58 | 28 | 56 | 23 | 90 | 106 | 101 | 105 | 115 | 104 |
| 38 | King .... ..... . | 37 | 2 | 40 | .. | 42 | 12 | 66 | 26 | 71 | 6 | 51 | 16 | 96 | 107 | 110 | 106 | 122 | 108 |
| 39 | Pense........... | 37 | 2 | 55 | 10 | 64 | 24 | 68 | 28 | 42 | 32 | 53 | 26 | 95 | 107 | 116 | 112 | 121 | 110 |
| 40 | Early Maine..... | 36 | 31 | 50 | .. | 52 | 2 | 78 | 8 | 92 | 32 | 62 | 1 | 95 | 102 | 115 | 119 | 117 | 110 |
| 41 | Rosedale ........ | 36 | 6 | 64 | 4 | 67 | 12 | 83 | 28 | 70 | 20 | 64 | 14 | 95 | 107 | 111 | 119 | 122 | 111 |
| 42 | Oxford .......... | 36 | 6 | 40 | .. | 48 | 28 | 77 | 22 | 60 | 20 | 52 | 22 | 96 | 110 | 110 | 117 | 119 | 110 |
| 43 | Early Blossom .. | 36 | 1 | 59 | 14 | 51 | 26 | 79 | 4 | 77 | 22 | 59 | 27 | 95 | 110 | 111 | 119 | 121 | 111 |
| 44 | Abyssinia........ | 35 | 30 | 62 | 32 | 33 | 28 | 87 | 2 | 58 | 28 | 55 | 24 | 95 | 102 | 122 | 119 | 118 | 111 |
| 45 | Cromwell.. .. | 35 | 25 | 50 | .. | .. | .. | 73 | 30 | 71 | 26 | 57 | 29 | 96 | 107 | .... | 112 | 117 | 108 |
| 46 | Rennie's Prize... | 34 | 24 | 51 | 26 | 29 | 34 | 66 | 6 | 64 | 24 | 49 | 16 | 92 | 98 | 109 | 106 | 118 | 105 |
| 47 | Imported Irish .. | 34 | 4 | 49 | 14 | 28 | 8 | 67 | 2 | 64 | 4 | 48 | 20 | 89 | 98 | 114 | 106 | 116 | 105 |
| 48 | Oderbruch....... | 33 | 4 | 62 | 32 | 37 | 2 | 67 | 12 | 82 | 32 | 56 | 23 | 95 | 107 | 110 | 109 | 124 | 109 |
| 49 | Cream Egyptian. | 33 | 3 | 62 | 32 | 26 | 26 | 65 | 20 | 70 | 20 | 51 | 27 | 95 | 98 | 110 | 109 | 122 | 107 |
| 50 | Winter Grey .... | 31 | 26 | 58 | 38 | 35 | .. | 68 | 18 | 60 | .. | 59 | 30 | 90 | 104 | 115 | 106 | 107 | 105 |
| 51 | Early Archangel. | 31 | 26 | 40 | .. | 46 | 16 | 75 | 30 | 66 | 16 | 52 | 4 | 92 | 104 | 109 | 109 | 117 | 106 |
| 52 | Golden Tartarian | 31 | 8 | 72 | 12 | 83 | 18 | 63 | 18 | 69 | 14 | 64 | .. | 103 | 117 | 114 | 117 | 117 | 114 |
| 53 | Cal. Prolific Blk. | 30 | 20 | 67 | 22 | 68 | 8 | 68 | 28 | 61 | 8 | 59 | 10 | 99 | 102 | 114 | 112 | 117 | 109 |
| 54 | Black Beauty.... | 30 | 1 | 57 | 22 | .. | .. | 72 | 32 | 92 | 32 | 63 | 13 | 92 | 105 | .... | 117 | 117 | 108 |
| 55 | Newmarket ..... | 28 | 32 | 61 | 26 | 38 | 28 | 58 | 28 | 62 | 32 | 50 | 9 | 90 | 105 | 102 | 117 | 122 | 107 |
| 56 | Flying Scotchm'n | 28 | 23 | 82 | 12 | 47 | 12 | 79 | 24 | 74 | 4 | 62 | 15 | 93 | 93 | 110 | 112 | 117 | 105 |
| 57 | Coulommiers .... | 28 | 13 | 56 | 16 | 52 | 2 | 57 | 22 | 72 | 32 | 53 | 17 | 104 | 115 | 126 | 117 | 123 | 117 |

UNIFORM TEST PLOTS OF OATS—*Continued.*

| Number. | Name of Variety. | Yield of the Several Experimental Farms, Season of 1897. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Brandon, Man. Bush. | Brandon, Man. Lbs. | Indian Head, N.W.T. Bush. | Indian Head, N.W.T. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of all Farms. Bush. | Average of all Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Brandon, Man. Days. | Indian Head, N.W.T. Days. | Agassiz, B.C. Days. | Average of all Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 | White Monarch.. | 27 | 32 | 64 | 24 | .... | . | 70 | 10 | 67 | 2 | 57 | 17 | 102 | 98 | .... | 119 | 121 | 110 |
| 59 | Mortgage Lifter. | 27 | 17 | 69 | 14 | 44 | 26 | 63 | 8 | 66 | 8 | 54 | 8 | 89 | 105 | 101 | 106 | 110 | 102 |
| 60 | Prolific Black Tartarian ..... | 23 | 11 | 55 | 10 | .... | . | 60 | 20 | 70 | .. | 52 | 10 | 99 | 110 | .... | 117 | 121 | 112 |
| 61 | Doncaster Prize.. | 23 | 8 | 65 | 30 | 20 | 10 | 65 | 20 | 70 | 10 | 49 | 2 | 102 | 98 | 111 | 119 | 108 | 108 |
| 62 | Poland......... | 21 | 11 | 51 | 26 | 28 | 8 | 73 | 8 | 62 | 17 | 47 | 14 | 93 | 93 | 111 | 105 | 108 | 102 |
| 63 | Scotch Hopetoun | 18 | 3 | 53 | 18 | 54 | 24 | 57 | 22 | 64 | 24 | 49 | 25 | 102 | 107 | 116 | 117 | 121 | 113 |

Eighteen varieties are not reported on from Brandon as these were destroyed by frost and wind.

The twelve varieties of oats which have produced the largest crops during 1897 at the several experimental farms are the following :—

### Central Experimental Farm, Ottawa.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Giant ........ ... . | 57 | 12 | 7. White Russian.............. | 50 | 30 |
| 2. Mennonite................. | 56 | 11 | 8. Columbus.................. | 49 | 29 |
| 3. Improved American........ | 53 | 28 | 9. Wallis.. . ....... ......... | 49 | 9 |
| 4. Early Etampes............. | 53 | 23 | 10. Joanette...... ...... ...... | 49 | 4 |
| 5. White Schonen............. | 53 | 8 | 11. American Triumph ......... | 49 | 3 |
| 6. Early Golden Prolific..... . | 50 | 30 | 12. Wide Awake ..... ......... | 48 | 23 |

An average yield for the twelve sorts of 51 bushels 29 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wallis..................... | 87 | 22 | 7. Bavarian ................... | 72 | 12 |
| 2. Siberian O.A.C............. | 82 | 12 | 8. Golden Tartarian........... | 72 | 12 |
| 3. Flying Scotchman.......... | 82 | 12 | 9. Improved American. ....... | 72 | 12 |
| 4. Hazlett's Seizure........... | 78 | 22 | 10. Mortgage Lifter ........... | 69 | 14 |
| 5. White Wonder............. | 76 | 16 | 11. California Prolific Black..... | 67 | 22 |
| 6. White Russian............. | 73 | 18 | 12. Columbus..... ........ ..... | 67 | 2 |

An average yield of 75 bushels 6 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs |
|---|---|---|---|---|---|
| 1. Golden Tartarian........... | 83 | 18 | 7. Russell. .................... | 62 | 22 |
| 2. Early Golden Prolific....... | 76 | 26 | 8. Golden Beauty.............. | 57 | 12 |
| 3. Joanette.................... | 71 | 16 | 9. Siberian O. A. C ... ..... | 57 | 2 |
| 4. California Prolific Black .... | 68 | 8 | 10. Prize Cluster......... ..... | 56 | 6 |
| 5. Rosedale.................... | 67 | 12 | 11. Early Etampes.... ......... | 56 | 6 |
| 6. Pense ...................... | 64 | 24 | 12. Holstein Prolific............ | 55 | .. |

An average yield of 64 bushels 24 lbs. per acre.

Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Abyssinia | 87 | 2 | 7. Hazlett's Seizure | 82 | 12 |
| 2. Improved American | 86 | 26 | 8. Early Gothland | 82 | 12 |
| 3. Siberian O.A.C. | 86 | 16 | 9. Early Golden Prolific | 80 | 10 |
| 4. Columbus | 85 | 30 | 10. Golden Giant | 80 | 10 |
| 5. Olive | 85 | .. | 11. Mennonite | 80 | .. |
| 6. Rosedale | 83 | 28 | 12. Holstein Prolific | 80 | .. |

An average yield of 83 bushels 12 lbs. per acre.

Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Maine | 92 | 32 | 7. Improved American | 77 | 22 |
| 2. Black Beauty | 92 | 32 | 8. Buckbee's Illinois | 76 | 16 |
| 3. Golden Giant | 89 | 14 | 9. Bavarian | 75 | 30 |
| 4. Lincoln | 87 | 22 | 10. American Beauty | 74 | 24 |
| 5. Oderbruch | 82 | 32 | 11. Flying Scotchman | 74 | 4 |
| 6. Early Blossom | 77 | 22 | 12. Columbus | 73 | 18 |

An average yield of 81 bushels 11 lbs. per acre.

The twelve varieties which have produced the largest crops during 1897, taking the average results obtained at all the experimental farms are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved American | 72 | 22 | 7. Early Golden Prolific | 65 | .. |
| 2. Golden Giant | 70 | 5 | 8. Bavarian | 64 | 30 |
| 3. Siberian, O. A. C | 66 | 4 | 9. Rosedale | 64 | 14 |
| 4. Columbus | 65 | 11 | 10. Golden Tartarian | 64 | .. |
| 5. Mennonite | 65 | 11 | 11. Wallis | 63 | 27 |
| 6. American Beauty | 65 | 5 | 12. Black Beauty | 63 | 13 |

An average yield of 65 bushels 29 lbs. per acre.

The Banner does not appear in this select list this year, owing to its being injured at Brandon and to its being sown in a very exposed and windswept situation at Indian Head. At this latter farm the crop on the "uniform test plots" was only 52 bushels 2 lbs. per acre, whereas the same seed of Banner oats used on the "early medium and late sown plots" gave a return of 101 bushels 16 lbs. per acre.

## BARLEY.

The trial plots of barley have included thirty-five varieties in all, fifteen different sorts of two-rowed and twenty of six-rowed. Among the two-rowed sorts are included eight hybrid varieties which have been produced at the experimental farms, namely: Sidney, Victor, Beaver, Pacer, Nepean, Bolton, Monck and Rigid. Among the six-rowed sorts there are nine of these hybrids, namely: Pioneer, Trooper, Royal, Stella, Vanguard, Nugent, Summit, Phœnix and Surprise. The plots were of the same size as those sown with oats. The quantity of seed used in each case was at the rate of two bushels per acre, and the dates of sowing were the following: Ottawa, 30th April to 3rd May; Nappan, 25th and 26th May; Brandon, 13th May; Indian Head, 5th May; and at Agassiz, 17th April.

## UNIFORM TEST PLOTS OF TWO-ROWED BARLEY.

| Number. | Name of Variety. | Yield of the Several Experimental Farms, Season of 1897. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Newton. | 41 | 7 | 40 | 40 | 22 | 4 | 51 | 2 | 31 | 12 | 37 | 13 | 91 | 104 | 102 | 107 | 120 | 105 |
| 2 | Canadian Thorpe | 38 | 26 | 40 | 40 | 23 | 16 | 53 | 6 | 37 | 4 | 38 | 28 | 92 | 103 | 104 | 108 | 119 | 105 |
| 3 | Sidney. | 35 | 41 | 38 | 16 | 46 | 32 | 44 | 38 | 27 | 24 | 38 | 30 | 92 | 104 | 96 | 111 | 116 | 104 |
| 4 | Danish Chevalier | 34 | 38 | 39 | 28 | 30 | 20 | 52 | 4 | 31 | 12 | 37 | 30 | 91 | 104 | 103 | 111 | 117 | 105 |
| 5 | Victor | 34 | 28 | 35 | 40 | 42 | 4 | 45 | 30 | 30 | 20 | 37 | 34 | 92 | 104 | 99 | 107 | 121 | 105 |
| 6 | Beaver. | 34 | 8 | 34 | 28 | 34 | 8 | 52 | 24 | 28 | 36 | 36 | 40 | 90 | 104 | 96 | 111 | 118 | 104 |
| 7 | Pacer. | 32 | 41 | 37 | 4 | 46 | 12 | 43 | 26 | 29 | 8 | 37 | 37 | 92 | 104 | 99 | 107 | 114 | 103 |
| 8 | Nepean. | 31 | 27 | 40 | 40 | 46 | 2 | 47 | 34 | 32 | 44 | 39 | 39 | 92 | 104 | 99 | 107 | 119 | 104 |
| 9 | Bolton. | 31 | 23 | 37 | 24 | 37 | 4 | 47 | 14 | 28 | 6 | 36 | 14 | 92 | 104 | 96 | 107 | 119 | 104 |
| 10 | French Chevalier | 24 | 28 | 35 | 40 | 43 | 26 | 53 | 16 | 37 | 4 | 38 | 42 | 93 | 104 | 102 | 111 | 119 | 106 |
| 11 | Prize Prolific. | 22 | 24 | 34 | 8 | 34 | 38 | 50 | | 32 | 24 | 34 | 38 | 94 | 104 | 103 | 115 | 118 | 107 |
| 12 | Thanet. | 21 | 17 | 29 | 8 | 42 | 4 | 45 | 10 | 31 | 12 | 33 | 39 | 90 | 104 | 103 | 115 | 119 | 106 |
| 13 | Kinver Chevalier | 19 | 28 | 32 | 44 | 21 | 12 | 51 | 2 | 40 | 40 | 33 | 6 | 91 | 104 | 104 | 115 | 119 | 107 |
| 14 | Monck. | 18 | 26 | 23 | 36 | 21 | 22 | 37 | 24 | 28 | 16 | 25 | 44 | 98 | 104 | 102 | 111 | 117 | 106 |
| 15 | Rigid. | 14 | 8 | 21 | 32 | 32 | 24 | 50 | 10 | 27 | 4 | 29 | 6 | 97 | 104 | 96 | 107 | 115 | 104 |

The six varieties of two-rowed barley which have given the largest crops at the several experimental farms during 1897 are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Newton | 41 | 7 | 4. Danish Chevalier | 34 | 38 |
| 2. Canadian Thorpe | 38 | 26 | 5. Victor | 34 | 28 |
| 3. Sidney | 35 | 41 | 6. Beaver | 34 | 8 |

An average yield of 36 bushels 25 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Thorpe | 40 | 40 | 4. Danish Chevalier | 39 | 28 |
| 2. Newton | 40 | 40 | 5. Sidney | 38 | 16 |
| 3. Nepean | 40 | 40 | 6. Bolton | 37 | 24 |

An average yield of 39 bushels 31 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Sidney | 46 | 32 | 4. French Chevalier | 43 | 26 |
| 2. Pacer | 46 | 12 | 5. Victor | 42 | 4 |
| 3. Nepean | 46 | 2 | 6. Thanet | 42 | 4 |

An average yield of 44 bushels 21 lbs. per acre.

### Experimental Farm for the N. W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 53 | 16 | 4. Danish Chevalier | 52 | 4 |
| 2. Canadian Thorpe | 53 | 6 | 5. Kinver Chevalier | 51 | 2 |
| 3. Beaver | 52 | 24 | 6. Newton | 51 | 2 |

An average yield of 52 bushels 9 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Kinver Chevalier.......... | 40 | 40 | 4. Nepean .................... | 32 | 44 |
| 2. Canadian Thorpe..... ..... | 37 | 4 | 5. Prize Prolific ............... | 32 | 24 |
| 3. French Chevalier .......... | 37 | 4 | 6. Newton ................... | 31 | 12 |

An average yield of 35 bushels 13 lbs. per acre.

The six varieties of two-rowed barley which have given the largest crops during 1897, taking the average of the results obtained on all the experimental farms are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Nepean.................... | 39 | 39 | 4. Canadian Thorpe ..... ..... | 38 | 28 |
| 2. French Chevalier.......... | 38 | 42 | 5. Pacer ... ................ | 37 | 37 |
| 3. Sidney .................... | 38 | 30 | 6. Victor .................... | 37 | 34 |

An average yield of 38 bushels 27 lbs. per acre.

The average crop of all the varieties of two-rowed barley tested at each of the experimental farms was as follows: At Ottawa, 29 bush. 2 lbs. per acre; Nappan, 34 bush. 41 lbs.; Brandon, 34 bush. 44 lbs.; Indian Head, 48 bush. 16 lbs., and at Agassiz, 31 bush. 27 lbs. The average return given by the whole of the varieties at all the farms was 35 bush. 36 lbs. per acre.

### UNIFORM TEST PLOTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1897. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N. S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N. S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Odessa.......... | 54 | 3 | 46 | 12 | 40 | 30 | 68 | 6 | 33 | 36 | 48 | 27 | 87 | 86 | 96 | 99 | 112 | 96 |
| 2 | Pioneer .. ...... | 50 | 40 | 44 | 8 | 29 | 8 | 49 | 38 | 36 | 12 | 42 | 2 | 86 | 86 | 103 | 104 | 107 | 97 |
| 3 | Mensury........ | 49 | 18 | 52 | 4 | 34 | 18 | 66 | 42 | 38 | 16 | 48 | 10 | 90 | 90 | 96 | 99 | 110 | 97 |
| 4 | Trooper......... | 48 | 41 | 40 | .. | 51 | 12 | 57 | 44 | 32 | 30 | 46 | 6 | 86 | 94 | 96 | 99 | 111 | 97 |
| 5 | Royal...... .. . | 48 | 6 | 48 | 16 | 25 | 20 | 63 | 36 | 36 | 22 | 44 | 20 | 85 | 85 | 95 | 99 | 107 | 94 |
| 6 | Oderbruch .... | 48 | 6 | 50 | 20 | 34 | 28 | 71 | 2 | 40 | 20 | 48 | 44 | 86 | 90 | 95 | 99 | 102 | 94 |
| 7 | Rennie's Impr'v'd | 46 | 26 | 40 | 40 | 42 | 34 | 68 | 6 | 37 | 24 | 47 | 7 | 85 | 86 | 95 | 100 | 102 | 94 |
| 8 | Stella. ......... | 45 | 25 | 38 | 36 | 33 | 26 | 58 | 16 | 34 | 8 | 42 | 3 | 84 | 94 | 102 | 99 | 112 | 98 |
| 9 | Success ......... | 44 | 15 | 34 | 28 | 44 | 38 | 51 | 32 | 32 | 10 | 41 | 25 | 82 | 80 | 89 | 93 | 102 | 89 |
| 10 | Vanguard..... . | 44 | 13 | 46 | 32 | 29 | 18 | 66 | 32 | 37 | 24 | 44 | 43 | 84 | 85 | 95 | 99 | 107 | 94 |
| 11 | Petschora.. ..... | 43 | 36 | 45 | 20 | 35 | 40 | 70 | .. | 38 | 36 | 46 | 36 | 84 | 84 | 104 | 99 | 102 | 95 |
| 12 | Nugent ......... | 43 | 6 | 39 | 28 | 41 | 2 | 56 | 12 | 35 | 20 | 43 | 4 | 90 | 94 | 96 | 99 | 112 | 98 |
| 13 | Blue Barley..... | 42 | 34 | 42 | 24 | 27 | 34 | 65 | 40 | 42 | 24 | 44 | 12 | 84 | 88 | 93 | 100 | 112 | 95 |
| 14 | Summit,........ | 41 | 37 | 38 | 36 | 50 | 10 | 55 | 30 | 33 | 24 | 43 | 46 | 86 | 94 | 98 | 99 | 112 | 98 |
| 15 | Phœnix :........ | 41 | 11 | 40 | 20 | 39 | 18 | 51 | 12 | 33 | 16 | 41 | 5 | 85 | 85 | 96 | 100 | 102 | 94 |
| 16 | Excelsior .. .... | 40 | 40 | 37 | 20 | 49 | 8 | 57 | 34 | 30 | .. | 43 | 1 | 85 | 90 | 90 | 100 | 110 | 95 |
| 17 | Champion....... | 40 | 10 | 37 | 44 | 47 | 34 | 54 | 18 | 33 | 16 | 42 | 34 | 86 | 85 | 90 | 100 | 102 | 93 |
| 18 | Common........ | 40 | .. | 42 | 24 | 43 | 26 | 71 | 12 | 38 | 16 | 47 | 6 | 85 | 90 | 90 | 99 | 111 | 95 |
| 19 | Surprise......... | 38 | 12 | 40 | .. | 38 | 46 | 55 | 30 | 33 | 44 | 41 | 16 | 87 | 94 | 99 | 99 | 112 | 98 |
| 20 | Baxter.......... | 35 | 7 | 37 | 20 | 32 | 34 | 66 | 32 | 32 | 30 | 40 | 44 | 87 | 86 | 97 | 99 | 105 | 95 |

The six varieties of six-rowed barley which have given the largest crops at the several experimental farms during 1897 are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 54 | 3 | 4. Trooper | 48 | 41 |
| 2. Pioneer | 50 | 40 | 5. Royal | 48 | 6 |
| 3. Mensury | 49 | 18 | 6. Oderbruch | 48 | 6 |

An average crop of 49 bushels 43 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 52 | 4 | 4. Vanguard | 46 | 32 |
| 2. Oderbruch | 50 | 20 | 5. Odessa | 46 | 12 |
| 3. Royal | 48 | 16 | 6. Petschora | 45 | 20 |

An average crop of 48 bushels 9 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Trooper | 51 | 12 | 4. Champion | 47 | 34 |
| 2. Summit | 50 | 10 | 5. Success | 44 | 38 |
| 3. Excelsior | 49 | 8 | 6. Common | 43 | 26 |

An average crop of 47 bushels 37 lbs. per acre.

EXPERIMENTAL FARM FOR THE N.W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Common | 71 | 12 | 4. Odessa | 68 | 6 |
| 2. Oderbruch | 71 | 2 | 5. Rennie's Improved | 68 | 6 |
| 3. Petschora | 70 | .. | 6. Mensury | 66 | 42 |

An average crop of 69 bushels 11 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Blue Barley | 42 | 24 | 4. Mensury | 38 | 16 |
| 2. Oderbruch | 40 | 20 | 5. Common | 38 | 16 |
| 3. Petschora | 38 | 36 | 6. Vanguard | 37 | 24 |

An average crop of 39 bushels 15 lbs. per acre.

The six varieties of six-rowed barley which have given the largest crops during 1897, taking the average of the results obtained on all the experimental farms, are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Oderbruch | 48 | 44 | 4. Rennie's Improved | 47 | 7 |
| 2. Odessa | 48 | 27 | 5. Common | 47 | 6 |
| 3. Mensury | 48 | 10 | 6. Petschora | 46 | 36 |

An average crop of 47 bushels 38 lbs. per acre.

The average crop of all the varieties of six-rowed barley tested at each of the experimental farms was as follows: At Ottawa, 44 bush. 17 lbs. per acre; Nappan, 42 bush. 10 lbs.; Brandon, 38 bush. 29 lbs.; Indian Head, 61 bush. 16 lbs., and at Agassiz, 35 bush. 26 lbs. The average return given by the whole of the varieties at all the farms was 44 bush. 22 lbs. per acre.

## SPRING WHEAT.

The uniform test plots of spring wheat for 1897 have included thirty-eight varieties. Among these there were seventeen cross-bred sorts which have been produced at the experimental farms. These are Huron, Advance, Blenheim, Preston, Dufferin, Countess, Dawn, Rideau, Crown, Progress, Stanley, Admiral, Alpha, Vernon, Captor, Percy and Beauty. The size of the plots in each case was the same as those of the oats, and the quantity of seed sown was in the proportion of one and one-half bushels per acre. The dates of sowing were the following:—At Ottawa, 29th and 30th April; Nappan, 10th and 11th May; Brandon, 26th April; Indian Head, 24th April, and at Agassiz, 14th April.

### UNIFORM TEST PLOTS OF SPRING WHEAT.

| Number. | Name of Variety. | Yield of the several Experimental Farms, Season of 1897. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Wellman's Fife.. | 24 | 55 | 30 | 20 | 32 | 30 | 37 | 50 | 31 | 20 | 31 | 23 | 102 | 108 | 119 | 126 | 125 | 116 |
| 2 | White Fife ... | 23 | 5 | 18 | 20 | 40 | 30 | 35 | 30 | 29 | 20 | 29 | 21 | 100 | 113 | 115 | 126 | 126 | 116 |
| 3 | Colorado ... | 22 | 15 | 23 | 20 | 28 | 30 | 25 | .. | 23 | 20 | 24 | 29 | 94 | 107 | 110 | 126 | 126 | 113 |
| 4 | Monarch ....... | 22 | 7 | 23 | 20 | 34 | .. | 35 | 20 | 30 | 40 | 29 | 5 | 102 | 111 | 116 | 125 | 125 | 116 |
| 5 | Rio Grande ... | 22 | .. | 27 | 40 | 27 | 50 | 31 | 40 | 26 | .. | 27 | 2 | 101 | 113 | 111 | 126 | 125 | 115 |
| 6 | White Connell... | 21 | 30 | 28 | 20 | 32 | 40 | 35 | 20 | 31 | 40 | 29 | 54 | 102 | 111 | 119 | 126 | 126 | 117 |
| 7 | Old Red River... | 21 | 27 | 21 | .. | 26 | .. | 36 | 50 | 29 | 20 | 26 | 55 | 102 | 111 | 114 | 126 | 126 | 116 |
| 8 | Huron ......... | 21 | .. | 23 | 20 | 22 | 20 | 37 | .. | 27 | 20 | 26 | 12 | 96 | 111 | 112 | 119 | 126 | 113 |
| 9 | Advance ........ | 20 | 40 | 26 | 40 | 30 | 10 | 33 | 50 | 27 | 20 | 27 | 44 | 96 | 106 | 112 | 125 | 125 | 113 |
| 10 | White Russian... | 20 | 35 | 26 | 40 | 36 | 20 | 31 | 50 | 30 | .. | 29 | 5 | 101 | 113 | 115 | 126 | 123 | 116 |
| 11 | Hungarian ..... | 20 | 20 | 20 | 40 | 30 | 10 | 42 | . | 28 | .. | 28 | 14 | 98 | 113 | 110 | 119 | 126 | 113 |
| 12 | Blenheim.. | 20 | 17 | 21 | .. | 31 | 30 | 30 | 30 | 27 | 20 | 26 | 7 | 98 | 113 | 112 | 126 | 126 | 115 |
| 13 | Preston......... | 20 | 10 | 26 | 20 | 27 | 10 | 36 | .. | 31 | .. | 28 | 8 | 98 | 106 | 116 | 125 | 121 | 113 |
| 14 | Dufferin......... | 19 | 55 | 22 | 40 | 24 | 40 | 29 | 10 | 23 | 20 | 23 | 57 | 95 | 109 | 113 | 125 | 121 | 113 |
| 15 | Countess ........ | 19 | 55 | 17 | .. | 24 | 20 | 40 | 20 | 27 | 20 | 25 | 47 | 95 | 113 | 112 | 119 | 121 | 112 |
| 16 | Dawn........... | 19 | 55 | 22 | .. | 26 | .. | 35 | .. | 25 | .. | 25 | 35 | 95 | 109 | 109 | 119 | 113 | 109 |
| 17 | Rideau.. ....... | 19 | 55 | 18 | 40 | 26 | .. | 36 | 10 | 29 | .. | 25 | 57 | 95 | 109 | 115 | 119 | 117 | 111 |
| 18 | Crown ....... | 19 | 45 | 22 | .. | 33 | .. | 35 | 40 | 26 | .. | 27 | 17 | 96 | 111 | 110 | 119 | 126 | 112 |
| 19 | Goose.......... | 19 | 15 | 26 | 40 | 26 | 30 | 27 | 10 | 28 | 20 | 25 | 35 | 99 | 107 | 116 | 125 | 126 | 115 |
| 20 | Red Fife....... | 19 | 15 | 21 | .. | 35 | 20 | 37 | 50 | 29 | 40 | 28 | 37 | 102 | 113 | 115 | 125 | 121 | 115 |
| 21 | Pringle's Champlain .......... | 19 | .. | 19 | .. | 31 | .. | 37 | 10 | 27 | 40 | 26 | 46 | 97 | 111 | 115 | 119 | 126 | 114 |
| 22 | Progress .. ..... | 18 | 55 | 18 | 40 | 23 | .. | 37 | 50 | 28 | .. | 25 | 17 | 99 | 113 | 116 | 119 | 126 | 115 |
| 23 | Stanley ......... | 18 | 10 | 25 | 40 | 22 | 30 | 31 | .. | 25 | 40 | 24 | 36 | 98 | 106 | 112 | 122 | 121 | 112 |
| 24 | Admiral......... | 17 | 30 | 25 | .. | 30 | 30 | 40 | 10 | 28 | 20 | 28 | 18 | 100 | 110 | 115 | 119 | 121 | 113 |
| 25 | Alpha .......... | 17 | 10 | 23 | 20 | 29 | 40 | 37 | 20 | 30 | .. | 27 | 30 | 99 | 106 | 112 | 119 | 121 | 111 |
| 26 | Vernon ......... | 16 | 50 | 23 | 20 | 31 | 10 | 39 | .. | 28 | 20 | 27 | 44 | 101 | 109 | 109 | 125 | 126 | 114 |
| 27 | Captor......... | 16 | 50 | 22 | .. | 22 | 40 | 36 | .. | 30 | 40 | 25 | 38 | 98 | 113 | 116 | 119 | 117 | 113 |
| 28 | Percy ........ | 16 | 39 | 17 | 40 | 30 | 40 | 38 | 40 | 27 | .. | 26 | 8 | 98 | 111 | 112 | 119 | 115 | 111 |
| 29 | Campbell's White Chaff ......... | 16 | .. | 20 | 20 | 28 | 30 | 32 | 30 | 26 | 40 | 24 | 48 | 100 | 107 | 113 | 126 | 121 | 113 |
| 30 | Black Sea........ | 15 | 55 | 21 | 40 | 23 | 30 | 30 | 40 | 27 | .. | 23 | 45 | 96 | 109 | 110 | 119 | 112 | 109 |
| 31 | Golden Drop .... | 15 | .. | 22 | .. | 34 | 10 | 31 | 10 | 27 | .. | 25 | 52 | 96 | 106 | 112 | 126 | 117 | 111 |
| 32 | Ladoga.......... | 14 | 55 | 18 | .. | 24 | 20 | 28 | 40 | 25 | 20 | 22 | 15 | 96 | 105 | 110 | 128 | 114 | 111 |
| 33 | Beauty ......... | 14 | 35 | 23 | 20 | 22 | 30 | 33 | 20 | 24 | 20 | 23 | 37 | 101 | 113 | 114 | 119 | 112 | 112 |
| 34 | Beaudry.......... | 14 | .. | 20 | 20 | 29 | 40 | 36 | 10 | 27 | .. | 25 | 26 | 96 | 111 | 110 | 128 | 121 | 113 |
| 35 | Herisson Bearded | 13 | 50 | 22 | .. | 25 | 30 | 39 | .. | 28 | 40 | 25 | 48 | 98 | 109 | 111 | 126 | 125 | 114 |
| 36 | Red Fern .. .. | 12 | 59 | 26 | 40 | 29 | 10 | 38 | 30 | 25 | 40 | 26 | 36 | 101 | 107 | 115 | 125 | 125 | 115 |
| 37 | Dion's. . . ... | 12 | 50 | 26 | .. | 26 | 20 | 27 | 20 | 26 | 40 | 23 | 50 | 101 | 111 | 115 | 125 | 126 | 116 |
| 38 | Emporium ...... | 10 | 21 | 22 | 40 | 31 | .. | 36 | 40 | 24 | 26 | 25 | .. | 101 | 111 | 116 | 126 | 126 | 116 |

The twelve varieties of spring wheat which have given the largest crops at the several experimental farms during 1897 are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wellman's Fife | 24 | 55 | 7. Old Red River | 21 | 27 |
| 2. White Fife | 23 | 5 | 8. Huron | 21 | — |
| 3. Colorado | 22 | 15 | 9. Advance | 20 | 40 |
| 4. Monarch | 22 | 7 | 10. White Russian | 20 | 35 |
| 5. Rio Grande | 22 | — | 11. Hungarian | 20 | 20 |
| 6. White Connell | 21 | 30 | 12. Blenheim | 20 | 17 |

An average crop of 21 bushels 41 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wellman's Fife | 30 | 20 | 7. White Russian | 26 | 40 |
| 2. White Connell | 28 | 20 | 8. Preston | 26 | 20 |
| 3. Rio Grande | 27 | 40 | 9. Dion's | 26 | — |
| 4. Advance | 26 | 40 | 10. Stanley | 25 | 40 |
| 5. Goose | 26 | 40 | 11. Admiral | 25 | — |
| 6. Red Fern | 26 | 40 | 12. Vernon | 23 | 20 |

An average crop of 26 bushels 37 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Fife | 40 | 30 | 7. White Connell | 32 | 40 |
| 2. White Russian | 36 | 20 | 8. Wellman's Fife | 32 | 30 |
| 3. Red Fife | 35 | 20 | 9. Blenheim | 31 | 30 |
| 4. Golden Drop | 34 | 10 | 10. Vernon | 31 | 10 |
| 5. Monarch | 34 | — | 11. Pringle's Champlain | 31 | — |
| 6. Crown | 33 | — | 12. Emporium | 31 | — |

An average crop of 33 bushels 36 lbs. per acre.

### Experimental Farm for the N. W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Hungarian | 42 | — | 7. Red Fern | 38 | 30 |
| 2. Countess | 40 | 20 | 8. Wellman's Fife | 37 | 50 |
| 3. Admiral | 40 | 10 | 9. Progress | 37 | 50 |
| 4. Vernon | 39 | — | 10. Red Fife | 37 | 50 |
| 5. Herisson Bearded | 39 | — | 11. Alpha | 37 | 20 |
| 6. Percy | 38 | 40 | 12. Pringle's Champlain | 37 | 10 |

An average crop of 38 bushels 48 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Connell | 31 | 40 | 7. White Russian | 30 | — |
| 2. Wellman's Fife | 31 | 20 | 8. Red Fife | 29 | 40 |
| 3. Preston | 31 | — | 9. White Fife | 29 | 20 |
| 4. Captor | 30 | 40 | 10. Old Red River | 29 | 20 |
| 5. Monarch | 30 | 40 | 11. Rideau | 29 | — |
| 6. Alpha | 30 | — | 12. Herisson Bearded | 28 | 40 |

An average crop of 30 bushels 7 lbs. per acre.

The twelve varieties of spring wheat which have given the largest crops, taking the average of the results obtained at all the experimental farms are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wellman's Fife | 31 | 23 | 7. Red Fife | 28 | 37 |
| 2. White Connell | 29 | 54 | 8. Admiral | 28 | 18 |
| 3. White Fife | 29 | 21 | 9. Hungarian | 28 | 14 |
| 4. Monarch | 29 | 5 | 10. Preston | 28 | 8 |
| 5. White Russian | 29 | 5 | 11. Advance | 27 | 44 |
| 6. Herisson Bearded | 28 | 40 | 12. Vernon | 27 | 44 |

An average crop of 28 bushels 51 lbs. per acre.

The average crop of all the varieties of spring wheat tested at each of the experimental farms was as follows :—At Ottawa, 18 bush. 22 lbs. per acre ; Nappan, 22 bush. 45 lbs. ; Brandon, 28 bush. 44 lbs. ; Indian Head, 34 bush. 47 lbs., and at Agassiz, 27 bush. 35 lbs. The average return given by the whole of the varieties of spring wheat at all the farms was 26 bushels 27 lbs. per acre.

## PEASE.

The trial plots of pease during the past season have included forty varieties. Among these there are twenty of the cross-bred sorts which have been originated at the experimental farms. These are Arthur, King, Macoun, Perth, Victoria, Vincent, Carleton, Alma, Agnes, Kent, Duke, Nelson, Paragon, Bedford, Bruce, Bright, Archer, Mackay, Trilby, Prince. These were all sown in plots of one-tenth acre each at Brandon and Indian Head, and one-twentieth acre each at Ottawa, Nappan and Agassiz, and the quantity of seed used per acre has varied from two to three bushels, depending on the size of the pea. The dates of sowing were the following :—At Ottawa, 3rd and 4th May ; Nappan, 16th May ; Brandon, 17th April, Indian Head, 6th May, and at Agassiz, 1st May.

## UNIFORM TEST PLOTS OF PEASE.

| Number. | Name of Variety. | Yield at the several Experimental Farms, Season of 1897. — Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Brandon, Man. Bush. | Brandon, Man. Lbs. | Indian Head, N.W.T. Bush. | Indian Head, N.W.T. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of all the Farms. Bush. | Average of all the Farms. Lbs. | Number of Days from Sowing to Harvesting. — Ottawa, Ont. Days. | Nappan, N.S. Days. | Brandon, Man. Days. | Indian Head, N.W.T. Days. | Agassiz, B.C. Days. | Average of all the Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Canadian Beauty | 31 | 50 | 16 | .. | 30 | 20 | 29 | .. | 27 | 20 | 26 | 54 | 112 | 116 | 131 | 111 | 114 | 117 |
| 2 | Oddfellow....... | 30 | 30 | 28 | 40 | 29 | 20 | 27 | .. | 23 | .. | 27 | 42 | 95 | 116 | 131 | 105 | 116 | 113 |
| 3 | Arthur.......... | 30 | 20 | 13 | 20 | 29 | 30 | 34 | 10 | 28 | 20 | 27 | 8 | 95 | 104 | 125 | 109 | 115 | 110 |
| 4 | Creeper......... | 29 | 40 | 22 | 40 | 36 | 40 | 30 | 50 | 25 | 20 | 29 | 2 | 109 | 116 | 131 | 111 | 104 | 114 |
| 5 | King.......... | 29 | 35 | 31 | 40 | 42 | 40 | 28 | 40 | 31 | 20 | 32 | 47 | 109 | 116 | 131 | 111 | 107 | 115 |
| 6 | Macoun. ...... | 27 | 40 | 16 | 40 | 25 | .. | 32 | 20 | 24 | .. | 25 | 8 | 119 | 123 | 140 | 112 | 114 | 122 |
| 7 | Prussian Blue.... | 27 | 20 | 30 | .. | 35 | .. | 24 | 30 | 24 | 40 | 28 | 18 | 100 | 120 | 131 | 110 | 114 | 115 |
| 8 | Prince Albert.... | 27 | 5 | 22 | 20 | 32 | .. | 34 | 40 | 26 | .. | 28 | 25 | 117 | 123 | 141 | 110 | 114 | 121 |
| 9 | Crown ......... | 26 | 50 | 35 | .. | 33 | 40 | 32 | 50 | 13 | 20 | 28 | 20 | 103 | 104 | 125 | 110 | 108 | 110 |
| 10 | Harrison's Glory. | 26 | 40 | 19 | 20 | 32 | .. | 22 | .. | 21 | 40 | 24 | 20 | 98 | 111 | 130 | 105 | 105 | 110 |
| 11 | Early Britain.... | 26 | 30 | 50 | .. | 26 | 40 | 28 | .. | 24 | 20 | 31 | 6 | 95 | 109 | 125 | 105 | 105 | 108 |
| 12 | Perth......... | 26 | 20 | 31 | 40 | 24 | 40 | 29 | 30 | 23 | .. | 27 | 2 | 108 | 109 | 131 | 109 | 107 | 113 |
| 13 | Victoria ........ | 26 | .. | 22 | .. | 35 | 20 | 33 | .. | 24 | .. | 28 | 4 | 118 | 123 | 135 | 110 | 103 | 118 |
| 14 | Vincent......... | 25 | 50 | 26 | 40 | 26 | .. | 31 | 40 | 28 | 40 | 27 | 46 | 107 | 116 | 130 | 110 | 107 | 114 |
| 15 | Carleton......... | 25 | 40 | 20 | 40 | 36 | 40 | 30 | 40 | 23 | .. | 27 | 20 | 107 | 109 | 140 | 110 | 115 | 116 |
| 16 | New Potter...... | 25 | 20 | 22 | .. | 34 | 40 | 33 | 20 | 19 | 40 | 27 | .. | 115 | 116 | 131 | 112 | 105 | 116 |
| 17 | Alma ........... | 25 | .. | 22 | .. | 40 | 40 | 30 | 30 | 20 | 20 | 27 | 42 | 109 | 104 | 131 | 109 | 116 | 114 |
| 18 | Agnes ......... | 24 | 45 | 11 | 20 | 32 | .. | 24 | 50 | 14 | 40 | 21 | 31 | 98 | 111 | 130 | 109 | 105 | 111 |
| 19 | Elephant Blue... | 24 | 40 | 24 | 40 | 34 | .. | 25 | 50 | 23 | 20 | 26 | 30 | 97 | 111 | 125 | 105 | 116 | 111 |
| 20 | Kent......... ... | 24 | 30 | 15 | .. | 34 | .. | 26 | 30 | 24 | 40 | 24 | 56 | 114 | 120 | 131 | 110 | 114 | 118 |
| 21 | Duke.......... | 24 | 30 | 26 | 40 | 27 | .. | 28 | 20 | 23 | 40 | 26 | 2 | 111 | 123 | 140 | 109 | 115 | 120 |
| 22 | Black Eyed Marrowfat......... | 24 | 20 | 16 | 40 | 29 | 20 | 28 | 50 | 16 | 40 | 23 | 10 | 108 | 111 | 131 | 111 | 114 | 115 |
| 23 | Mummy........ | 23 | 50 | 16 | 40 | 37 | 40 | 28 | 50 | 22 | .. | 25 | 48 | 95 | 104 | 130 | 110 | 106 | 109 |
| 24 | Nelson ........ | 23 | 45 | 23 | 20 | 26 | 40 | 29 | 40 | 29 | 20 | 26 | 33 | 95 | 111 | 128 | 105 | 116 | 111 |
| 25 | Paragon ........ | 22 | 50 | 16 | 40 | 26 | 40 | 29 | 30 | 22 | 40 | 23 | 40 | 117 | 120 | 142 | 110 | 107 | 119 |
| 26 | Bedford......... | 22 | 50 | 17 | 20 | 40 | .. | 27 | 20 | 25 | 20 | 26 | 34 | 118 | 127 | 142 | 112 | 115 | 123 |
| 27 | Chancellor...... | 22 | .. | 30 | .. | 34 | .. | 28 | 40 | 23 | 20 | 27 | 36 | 93 | 109 | 115 | 103 | 116 | 107 |
| 28 | Bruce........... | 21 | 30 | 22 | 20 | 21 | 20 | 27 | 10 | 22 | 40 | 23 | .. | 108 | 120 | 142 | 110 | 114 | 119 |
| 29 | Multiplier. ... | 21 | .. | 18 | 40 | 26 | 20 | 30 | .. | 16 | 20 | 22 | 28 | 106 | 120 | 138 | 111 | 114 | 118 |
| 30 | Golden Vine..... | 20 | 50 | 16 | .. | 34 | .. | 34 | 10 | 20 | 20 | 25 | 4 | 106 | 116 | 125 | 110 | 105 | 112 |
| 31 | Large White Marrowfat......... | 20 | 30 | 20 | 40 | 22 | 40 | 31 | 50 | 24 | 40 | 24 | 4 | 100 | 120 | 135 | 112 | 116 | 117 |
| 32 | Bright .......... | 20 | 20 | 26 | 40 | 37 | 20 | 40 | .. | 30 | 20 | 30 | 56 | 117 | 127 | 142 | 112 | 116 | 123 |
| 33 | Centennial ...... | 20 | 20 | 31 | 40 | 35 | 40 | 35 | 40 | 17 | 40 | 28 | 12 | 109 | 123 | 131 | 111 | 114 | 118 |
| 34 | Archer...... .. | 20 | .. | 24 | .. | 36 | .. | 34 | 10 | 29 | 40 | 28 | 46 | 106 | 127 | 131 | 109 | 105 | 116 |
| 35 | Mackay......... | 17 | 40 | 18 | 20 | 35 | .. | 23 | 20 | 17 | 40 | 22 | 24 | 102 | 120 | 131 | 110 | 114 | 115 |
| 36 | Trilby .......... | 15 | 40 | 22 | 20 | 38 | 20 | 31 | 50 | 20 | .. | 25 | 38 | 118 | 123 | 131 | 110 | 116 | 120 |
| 37 | Prince.......... | 15 | .. | 19 | 20 | 33 | 20 | 27 | 30 | 20 | .. | 22 | 50 | 106 | 120 | 131 | 111 | 114 | 116 |
| 38 | Dan'l O'Rourke.. | 14 | .. | 11 | 20 | 25 | 20 | 34 | 10 | 16 | 20 | 20 | 14 | 93 | 104 | 123 | 107 | 103 | 106 |
| 39 | White Wonder.. | 9 | 5 | 23 | 20 | 34 | 40 | 30 | 10 | 23 | 40 | 24 | 11 | 93 | 109 | 123 | 106 | 105 | 107 |
| 40 | Pride ........... | 7 | 40 | 21 | 40 | 31 | 40 | 29 | 50 | 16 | 20 | 21 | 26 | 94 | 120 | 124 | 109 | 104 | 110 |

The twelve varieties of pease which have given the largest crops at the several experimental farms during 1897, are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Per Acre. Lbs. | | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Beauty ......... | 31 | 50 | 7. Prussian Blue .... ......... | 27 | 20 |
| 2. Oddfellow ............... | 30 | 30 | 8. Prince Albert .............. | 27 | 5 |
| 3. Arthur .................. | 30 | 20 | 9. Crown .... ............... | 26 | 50 |
| 4. Creeper ................. | 29 | 40 | 10. Harrison's Glory ...... ..... | 26 | 40 |
| 5. King .................... | 29 | 35 | 11. Early Britain ...... ....... | 26 | 30 |
| 6. Macoun ............... .... | 27 | 40 | 12. Perth ..................... | 26 | 20 |

An average crop of 28 bushels 22 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Britain | 50 | .. | 7. Prussian Blue | 30 | .. |
| 2. Crown | 35 | .. | 8. Oddfellow | 28 | 40 |
| 3. Perth | 31 | 40 | 9. Bright | 26 | 40 |
| 4. Centennial | 31 | 40 | 10. Duke | 26 | 40 |
| 5. King | 31 | 40 | 11. Vincent | 26 | 40 |
| 6. Chancellor | 30 | .. | 12. Elephant Blue | 24 | 40 |

An average crop of 31 bushels 7 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King | 42 | 40 | 7. Carleton | 36 | 40 |
| 2. Alma | 40 | 40 | 8. Creeper | 36 | 40 |
| 3. Bedford | 40 | .. | 9. Archer | 36 | .. |
| 4. Trilby | 38 | 20 | 10. Centennial | 35 | 40 |
| 5. Mummy | 37 | 40 | 11. Victoria | 35 | 20 |
| 6. Bright | 37 | 20 | 12. Mackay | 35 | .. |

An average crop of 37 bushels 40 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Bright | 40 | .. | 7. New Potter | 33 | 20 |
| 2. Centennial | 35 | 40 | 8. Victoria | 33 | .. |
| 3. Prince Albert | 34 | 40 | 9. Crown | 32 | 50 |
| 4. Golden Vine | 34 | 10 | 10. Macoun | 32 | 20 |
| 5. Daniel O'Rourke | 34 | 10 | 11. Large White Marrowfat | 31 | 50 |
| 6. Arthur | 34 | 10 | 12. Trilby | 31 | 50 |

An average crop of 34 bushels per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King | 31 | 20 | 7. Canadian Beauty | 27 | 20 |
| 2. Bright | 30 | 20 | 8. Prince Albert | 26 | .. |
| 3. Archer | 29 | 40 | 9. Creeper | 25 | 20 |
| 4. Nelson | 29 | 20 | 10. Bedford | 25 | 20 |
| 5. Vincent | 28 | 40 | 11. Prussian Blue | 24 | 40 |
| 6. Arthur | 28 | 20 | 12. Kent | 24 | 40 |

An average crop of 27 bushels 35 lbs. per acre.

The twelve varieties which have given the largest crops, taking the average results obtained at all the experimental farms are the following :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King | 32 | 47 | 7. Crown | 28 | 20 |
| 2. Early Britain | 31 | 6 | 8. Prussian Blue | 28 | 18 |
| 3. Bright | 30 | 56 | 9. Centennial | 28 | 12 |
| 4. Creeper | 29 | 2 | 10. Victoria | 28 | 4 |
| 5. Archer | 28 | 46 | 11. Vincent | 27 | 46 |
| 6. Prince Albert | 28 | 25 | 12. Alma | 27 | 42 |

An average crop of 29 bushels 7 lbs. per acre.

The average crop of all the varieties of pease tested at each of the experimental farms was as follows :—At Ottawa, 23 bush. 15 lbs. per acre ; Nappan, 22 bush. 38 lbs. ; Brandon, 31 bush. 53 lbs ; Indian Head, 30 bush. 4 lbs., and at Agassiz, 22 bush. 44 lbs. The average return given by the whole of the varieties at all the farms is 26 bushels 7 lbs. per acre.

## INDIAN CORN.

Twenty-four varieties of Indian corn have been under trial during 1897, all planted on uniform soil in rows three feet apart and the plants thinned out to six or eight inches apart in the row. The dates of planting were the following:—At Ottawa, 25th May; Nappan, 4th June; Brandon, 19th May; Indian Head, 19th May, and at Agassiz, from 18th May to 1st June. All were cut green and put into the silo for the winter feeding of stock. The dates of cutting were:—At Ottawa, 17th September; Nappan, 3rd October; Brandon, 28th August; Indian Head, 4th September, and at Agassiz, 28th September. The yield per acre has been calculated in each case from the weight obtained from two rows each 66 feet long.

### UNIFORM TEST PLOTS OF INDIAN CORN.

| Number. | Name of Variety. | Yield at the Several Experimental Farms—Season of 1897. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, Ont. | | Brandon, Manitoba. | | Indian Head. N. W. T. | | Agassiz, B. C. | | Average of all farms. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Selected Leaming.... | 36 | 1,260 | 13 | 400 | 13 | 400 | 10 | 1,450 | 43 | 900 | 23 | 882 |
| 2 | Giant Prolific Ensilage | 36 | 1,062 | 4 | 250 | 13 | 400 | 16 | 450 | 32 | 350 | 20 | 902 |
| 3 | Cloud's Early Yellow | 32 | 416 | 9 | 1,470 | 16 | 1,000 | 14 | 50 | 24 | 400 | 19 | 667 |
| 4 | Red Cob Ensilage.... | 30 | 1,512 | 13 | 500 | 16 | 100 | 12 | 1,300 | 43 | 900 | 23 | 462 |
| 5 | Cuban Giant ........ | 26 | 800 | 8 | 1,270 | 17 | 1,200 | 15 | 250 | 42 | 700 | 22 | 44 |
| 6 | Rural Thoroughbred White Flint....... | 26 | 767 | 6 | 870 | 16 | 100 | 8 | 1,600 | 29 | 300 | 17 | 727 |
| 7 | Champion White Pearl............ | 25 | 556 | 11 | .... | 19 | 1,600 | 11 | 1,650 | 27 | 780 | 19 | 117 |
| 8 | North Dakota White. | 25 | 292 | 7 | 1,400 | 11 | .... | ..... | ..... | 34 | 200 | 19 | 973 |
| 9 | Mamm. 8 rowed Flint | 24 | 708 | 13 | 400 | 16 | 1,000 | 12 | 1,200 | 35 | 950 | 20 | 582 |
| 10 | Ninety-day.......... | 23 | 992 | 5 | 340 | 11 | 1,760 | 11 | 1,650 | 29 | 1,400 | 16 | 828 |
| 11 | Longfellow.......... | 22 | 1,870 | 11 | 550 | 11 | 1,100 | 12 | 200 | 19 | 610 | 15 | 866 |
| 12 | Pride of the North... | 22 | 1,804 | 6 | 870 | 11 | .... | 13 | 950 | 14 | 1,810 | 13 | 1,487 |
| 13 | North Dakota Yellow | 22 | 165 | 5 | 1,000 | 11 | .... | 12 | 750 | 16 | 780 | 13 | 939 |
| 14 | Early Butler........ | 21 | 1,296 | 6 | 1,970 | 18 | 1,400 | 13 | 1,170 | 37 | 800 | 19 | 1,327 |
| 15 | Sanford............. | 21 | 1,164 | 11 | 440 | 9 | 1,800 | 15 | 1,900 | 22 | .... | 16 | 261 |
| 16 | Extra Ey Huron Dent | 20 | 1,976 | 6 | 870 | 12 | 1,300 | 11 | 900 | ..... | ..... | 12 | 1,761 |
| 17 | Compton's Early .... | 20 | 1,976 | 10 | 460 | 14 | 1,700 | 11 | 1,870 | 18 | 1,840 | 15 | 769 |
| 18 | Angel of Midnight... | 20 | 1,580 | 10 | 240 | 19 | 1,600 | 10 | 900 | 33 | .... | 18 | 1,664 |
| 19 | White Cap Yellow Dent........ ... | 19 | 1,290 | 9 | 150 | 15 | 1,800 | 11 | 1,100 | 20 | 800 | 15 | 628 |
| 20 | Canada White Flint. | 18 | 1,818 | 9 | 1,800 | 10 | 900 | 12 | 1,850 | 17 | 1,860 | 14 | 46 |
| 21 | King of the Earliest . | 17 | 980 | 9 | 700 | 14 | 600 | 11 | .. | 31 | 700 | 16 | 1,396 |
| 22 | Pearce's Prolific..... | 17 | 848 | 6 | 870 | 9 | 700 | 12 | 200 | 28 | 100 | 14 | 1,344 |
| 23 | Mitchell's Extra Early | 16 | 736 | 4 | 800 | 13 | 400 | 12 | 1,300 | 14 | 50 | 12 | 257 |
| 24 | Mamm. Sweet Fodder | 13 | 1,720 | ..... | ..... | ..... | ..... | ..... | ..... | 26 | 800 | 20 | 260 |

The test of varieties in this case was not quite complete. The Mammoth Sweet Fodder was omitted at Nappan, Brandon and Indian Head. The North Dakota White was also omitted at Indian Head and the Extra Early Huron Dent at Agassiz for the reason that the seed did not arrive in time for planting.

The six varieties of Indian corn which have given the heaviest crops at the several experimental farms during 1897, are the following ;—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Leaming | 36 | 1260 | 4. Red Cob Ensilage | 30 | 1512 |
| 2. Giant Prolific Ensilage | 36 | 1062 | 5. Cuban Giant | 26 | 800 |
| 3. Cloud's Early Yellow | 32 | 416 | 6. Thoroughbred White Flint | 26 | 767 |

An average crop of 31 tons 969 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Compton's Early | 11 | 1100 | 4. Early Butler | 10 | 1670 |
| 2. Sanford | 11 | 440 | 5. Angel of Midnight | 10 | 1450 |
| 3. Longfellow | 11 | .... | 6. Cloud's Early Yellow | 10 | 1340 |

An average crop of 11 tons per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Champion White Pearl | 19 | 1600 | 4. Cuban Giant | 17 | 1200 |
| 2. Angel of Midnight | 19 | 1600 | 5. Mammoth 8-rowed Flint | 16 | 1000 |
| 3. Early Butler | 18 | 1400 | 6. Cloud's Early Yellow | 16 | 1000 |

An average crop of 18 tons 300 lbs. per acre.

EXPERIMENTAL FARM FOR THE N.W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Prolific Ensilage | 16 | 450 | 4. Cloud's Early Yellow | 14 | 50 |
| 2. Sanford | 15 | 1900 | 5. Early Butler | 13 | 1170 |
| 3. Cuban Giant | 15 | 350 | 6. Pride of the North | 13 | 950 |

An average crop of 14 tons 1,478 lbs per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage | 43 | 900 | 4. Early Butler | 37 | 800 |
| 2. Selected Leaming | 43 | 900 | 5. Mammoth 8-rowed Flint | 35 | 950 |
| 3. Cuban Giant | 42 | 700 | 6. North Dakota White | 34 | 200 |

An average crop of 39 tons 741 lbs. per acre.

The six varieties of Indian corn which have given the heaviest crops, taking the average of the results obtained at all the experimental farms are the following :—

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Leaming | 23 | 882 | 4. Giant Prolific Ensilage | 20 | 902 |
| 2. Red Cob Ensilage | 23 | 462 | 5. Mammoth 8-rowed Flint | 20 | 582 |
| 3. Cuban Giant | 22 | 44 | 6. Mammoth Sweet Fodder | 20 | 260 |

An average crop of 21 tons 1,189 lbs. per acre.

In considering the weights obtained from the varieties named in this last list, it must be borne in mind that most of the very large growing sorts are very late in ripening, and that the fodder they produce is immature and in-

ferior in quality. Hence the most productive of the earlier ripening sorts should be selected in preference, as producing the most nutritious food.

The average weight cut green of all the varieties of Indian corn tested at each of the experimental farms was as follows :—At Ottawa, 23 tons, 1,066 lbs. : Nappan, 8 tons, 1,394 lbs. ; Brandon, 14 tons, 211 lbs. ; Indian Head, 12 tons, 1,031 lbs., and at Agassiz, 27 tons, 1,784 lbs. The average return given by the whole of the varieties at all the farms was 17 tons 693 lbs.

## TURNIPS.

Eighteen varieties of turnips have been under test during 1897, sown on drills or on the flat in rows from 2 to 2½ feet apart. Two sowings were made at each farm, one sowing two weeks later than the other. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following :—At Ottawa, 13th and 14th October ; Nappan, 14th and 18th October ; Brandon, 1st October ; Indian Head, 5th October, and at Agassiz, 18th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each, 66 feet long.

UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | | Sown May 21. | | Sown. June 4. | | Sown. June 18. | | Sown May 20. | | Sown June 3. | | Sown May 18. | | Sown May 28. | | Sown May 14. | | Sown May 28. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Shamrock Purple Top. | 44 | 1,100 | 27 | 1,770 | 37 | 480 | 53 | 120 | 9 | 1,800 | 8 | 1,424 | 8 | 596 | 10 | 460 | 40 | 520 | 40 | 960 | 28 | 1,999 | 24 | 147 |
| 2 | Selected Purple Top... | 44 | 770 | 26 | 965 | 29 | 520 | 25 | 1,060 | 4 | 712 | 11 | 440 | 7 | 520 | 9 | 348 | 57 | 48 | 47 | 600 | 28 | 914 | 23 | 1,883 |
| 3 | Perfection Swede...... | 42 | 1,965 | 25 | 1,315 | 31 | 1,080 | 31 | 1,840 | 7 | 1,576 | 9 | 744 | 7 | 1,048 | 10 | 64 | 49 | 208 | 50 | 1,376 | 27 | 1,575 | 25 | 1,068 |
| 4 | Giant King ........... | 41 | 5 | 30 | 885 | 24 | 640 | 21 | 560 | 8 | 1,688 | 7 | 1,576 | 3 | 468 | 7 | 388 | 53 | 1,712 | 47 | 840 | 26 | 503 | 22 | 1,650 |
| 5 | Marquis of Lorne...... | 40 | 1,510 | 26 | 1,845 | 26 | 1,960 | 24 | 360 | 9 | 1,008 | 6 | 1,992 | 6 | 672 | 6 | 1,860 | 53 | 1,360 | 52 | 1,600 | 27 | 902 | 23 | 1,131 |
| 6 | Jumbo or Monarch.... | 40 | 905 | 28 | 925 | 24 | 360 | 19 | 760 | 8 | 1,424 | 8 | 632 | 6 | 400 | 8 | 896 | 54 | 1,120 | 51 | 1,400 | 26 | 1,642 | 23 | 523 |
| 7 | Prize Winner.......... | 40 | 850 | 26 | 855 | 25 | 1,060 | 23 | 1,880 | 9 | 216 | 10 | 856 | 6 | 1,332 | 7 | 1,180 | 66 | 1,555 | 49 | 1,000 | 29 | 1,403 | 23 | 1,154 |
| 8 | Mammoth Clyde....... | 39 | 1,915 | 28 | 815 | 25 | 1,820 | 24 | 780 | 10 | 328 | 6 | 1,200 | 4 | 1,504 | 6 | 1,464 | 50 | 760 | 44 | 880 | 26 | 465 | 22 | 228 |
| 9 | Carter's Elephant..... | 38 | 1,220 | 34 | 1,300 | 27 | 1,380 | 19 | 1,520 | 8 | 1,952 | 7 | 520 | 5 | 1,352 | 7 | 1,312 | 53 | 1,712 | 47 | 840 | 26 | 1,923 | 23 | 698 |
| 10 | East Lothian ......... | 38 | 230 | 30 | 445 | 30 | 800 | 24 | 360 | 9 | 480 | 8 | 1,688 | 6 | 408 | 7 | 1,576 | 56 | 1,168 | 60 | 384 | 28 | 217 | 26 | 491 |
| 11 | Prize Purple Top...... | 36 | 1,975 | 24 | 510 | 26 | 1,960 | 22 | 840 | 9 | 1,536 | 8 | 1,160 | 4 | 1,372 | 10 | 1,648 | 58 | 1,040 | 58 | 160 | 27 | 777 | 24 | 1,664 |
| 12 | Hall's Westbury....... | 36 | 1,590 | 26 | 910 | 25 | 1,060 | 26 | 1,960 | 11 | 1,232 | 8 | 1,952 | 8 | 1,424 | 10 | 268 | 53 | 40 | 48 | 1,504 | 27 | 269 | 24 | 519 |
| 13 | Hartley's Bronze..... | 36 | 765 | 27 | 780 | 32 | 600 | 28 | 1,760 | 8 | 896 | 8 | 1,952 | 9 | 1,548 | 10 | 856 | 55 | 880 | 50 | 1,376 | 28 | 938 | 25 | 545 |
| 14 | Skirving's............ | 36 | 600 | 28 | 1,915 | 31 | 320 | 20 | 1,180 | 8 | 1,952 | 8 | 1,160 | 6 | 1,464 | 9 | 1,932 | 55 | | 49 | 1,264 | 27 | 1,268 | 23 | 1,090 |
| 15 | Sutton's Champion ... | 35 | 1,280 | 22 | 55 | 25 | 1,820 | 24 | 1,540 | 8 | 632 | 9 | 1,800 | 7 | 256 | 8 | 1,820 | 45 | 200 | 42 | 1,360 | 24 | 837 | 21 | 1,315 |
| 16 | Halewood's Bronze Top | 35 | 345 | 24 | 235 | 36 | 200 | 25 | 1,820 | 11 | 440 | 8 | 1,424 | 4 | 316 | 8 | 1,160 | 56 | 200 | 51 | 80 | 28 | 1,100 | 23 | 1,344 |
| 17 | Bangholm Selected .... | 34 | 1,300 | 27 | 890 | 28 | 1,760 | 24 | 780 | 9 | 216 | 8 | 1,424 | 4 | 1,768 | 6 | 1,464 | 47 | 600 | 46 | 840 | 24 | 1,929 | 22 | 1,480 |
| 18 | Champion Purple Top . | 32 | 1,395 | 27 | 1,110 | 28 | 240 | 24 | 1,540 | 7 | 1,048 | 6 | 1,728 | 7 | 256 | 8 | 1,820 | 47 | 600 | 45 | 200 | 24 | 1,108 | 22 | 1,278 |

The crops from the successive growings of turnips at the experimental farms have averaged as follows :—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing.................. | 38 | 1,318 |
| do do second sowing.......... | 27 | 862 |
| Experimental Farm, Nappan, first sowing.............. | 28 | 1,559 |
| do do second sowing.................. | 24 | 1,592 |
| Experimental Farm, Brandon, Man., first sowing........ | 8 | 1,952 |
| Experimental Farm, Brandon, Man., second sowing.......... | 8 | 1,199 |
| Experimental Farm, Indian Head, N.W.T., first sowing....... | 6 | 817 |
| do do do second sowing .... | 8 | 1,362 |
| Experimental Farm, Agassiz, first sowing................. | 52 | 1,985 |
| do do second sowing ................ | 49 | 259 |

Average crop from all the plots at all the farms, first sowing, 27 tons 326 lbs. ; second sowing, 23 tons 1,456 lbs.

It will be seen by reference to the table that the first sowing of turnips at each of the experimental farms, has given the larger crop excepting at Indian Head. The average of all the sowings at all the farms show 3 tons 1,871 lbs. per acre more from the first sowing than from the second.

The six varieties of turnips which have given the heaviest crops at the several experimental farms during the season of 1897, are the following. Where not otherwise stated the quantities given are all from the early sown plots :

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Shamrock Purple Top | 44 | 1,100 | 4. Giant King | 41 | 5 |
| 2. Selected Purple Top | 44 | 770 | 5. Marquis of Lorne, | 40 | 1,510 |
| 3. Perfection Swede | 42 | 1,965 | 6. Jumbo or Monarch | 40 | 905 |

An average crop of 42 tons 709 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Shamrock Purple Top | 37 | 480 | 4. Perfection Swede, 2nd sowing | 31 | 1,840 |
| 2. Halewood's Bronze Top | 36 | 200 | 5. Skirvings | 31 | 320 |
| 3. Hartley's Bronze | 32 | 600 | 6. East Lothian | 30 | 800 |

An average crop of 33 tons 373 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hall's Westbury | 11 | 1,232 | 4. Shamrock Purple Top | 9 | 1,800 |
| 2. Halewood's Bronze Top | 11 | 440 | 5. Prize Purple Top | 9 | 1,536 |
| 3. Mammoth Clyde | 10 | 328 | 6. Marquis of Lorne | 9 | 1,008 |

An average crop of 10 tons 724 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Prize Purple Top, 2nd sowing | 10 | 1,648 | 4. Hall's Westbury, 2nd sowing | 10 | 268 |
| 2. Hartley's Bronze, 2nd sowing | 10 | 856 | 5. Perfection Swede, 2nd sowing | 10 | 64 |
| 3. Shamrock Purple Top, 2nd sowing | 10 | 460 | 6. Skirvings, 2nd sowing | 9 | 1,932 |

An average crop of 10 tons 538 lbs per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Prize Winner | 66 | 1,555 | 4. Selected Purple Top | 57 | 48 |
| 2. East Lothian, 2nd sowing | 60 | 384 | 5. Halewood's Bronze Top | 56 | 200 |
| 3. Prize Purple Top, 2nd sowing | 58 | 1,040 | 6. Hartley's Bronze | 55 | 880 |

An average crop of 59 tons 18 lbs. per acre.

The six varieties of turnips which have produced the heaviest crops, taking the average of the results obtained at all the experimental farms, are the following :—

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Prize Winner | 29 | 1,403 | 4. Hartley's Bronze Top | 28 | 938 |
| 2. Shamrock Purple Top | 28 | 1,999 | 5. Selected Purple Top | 28 | 914 |
| 3. Halewood's Bronze Top | 28 | 1,100 | 6. East Lothian | 28 | 217 |

An average crop of 28 tons 1,428 lbs. per acre.

## MANGELS.

Eighteen varieties of mangels were under trial in 1897, all sown on drills or on the flat from 2 to 2½ feet apart. Two sowings were made at each farm, the second sowing, two weeks later than the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following :—At Ottawa, 11th October ; Nappan, 14th and 15th October ; Brandon, 30th September ; Indian Head, 4th October ; and at Agassiz, 15th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N. S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B. C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8 | | Sown May 21. | | Sown June 4. | | Sown June 18. | | Sown May 20. | | Sown June 3. | | Sown May 18. | | Sown May 28. | | Sown April 24. | | Sown May 8. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Giant Yellow Intermediate (Steele) | 46 | 1,060 | 37 | 305 | 34 | 400 | 23 | 1,880 | 22 | 352 | 16 | 1,000 | 10 | 1,120 | 13 | 1,852 | 34 | 1,080 | 31 | 40 | 29 | 1,202 | 24 | 1,015 |
| 2 | Gate Post | 44 | 1,815 | 35 | 1,335 | 26 | 1,200 | 17 | 960 | 14 | 776 | 20 | 128 | 12 | 420 | 13 | 1,984 | 34 | 992 | 36 | 160 | 26 | 1,041 | 24 | 1,313 |
| 3 | Canadian Giant | 40 | 1,345 | 28 | 1,420 | 28 | 1,000 | 20 | 1,040 | 21 | 32 | 20 | 1,184 | 7 | 388 | 11 | 176 | 35 | 752 | 28 | 1,200 | 26 | 1,103 | 21 | 1,804 |
| 4 | Golden Tankard | 35 | 950 | 22 | 605 | 25 | 1,060 | 19 | 1,520 | 17 | 584 | 14 | 1,832 | 8 | 1,820 | 12 | 684 | 27 | 912 | 26 | 360 | 22 | 1,865 | 19 | 200 |
| 5 | Mammoth Long Red | 34 | 1,960 | 28 | 485 | 27 | 1,480 | 23 | 1,100 | 15 | 1,680 | 18 | 696 | 10 | 1,780 | 13 | 268 | 32 | 1,824 | 30 | 1,600 | 24 | 945 | 22 | 1,630 |
| 6 | Champion Yellow Globe | 34 | 1,630 | 22 | 605 | 26 | 1,200 | 23 | 1,100 | 26 | 8 | 15 | 96 | 10 | 1,912 | 12 | 1,476 | 27 | 1,000 | 25 | 656 | 25 | 350 | 19 | 1,587 |
| 7 | Selected Mamm. Long Red | 34 | 845 | 23 | 1,850 | .... | .... | .... | .... | 23 | 464 | 26 | 1,328 | 10 | 1,120 | 12 | 1,470 | 39 | 1,024 | 32 | 240 | 26 | 1,863 | 23 | 1,722 |
| 8 | Yellow Intermediate | 33 | 715 | 21 | 1,560 | 29 | 1,280 | 21 | 1,320 | 6 | 672 | 17 | 56 | 10 | 1,912 | 15 | 1,944 | 31 | 1,184 | 27 | 1,000 | 22 | 753 | 20 | 1,576 |
| 9 | Red Fleshed Tankard | 32 | 1,010 | 28 | 815 | 25 | 300 | 14 | 880 | 11 | 176 | 6 | 144 | 6 | 1,728 | 8 | 92 | 39 | 320 | 35 | 400 | 22 | 1,907 | 18 | 866 |
| 10 | Red Fleshed Globe | 32 | 405 | 23 | 365 | 21 | 560 | 22 | 80 | 20 | 392 | 13 | 1,984 | 9 | 216 | 10 | 460 | 24 | 1,288 | 24 | 400 | 21 | 971 | 18 | 1,458 |
| 11 | Giant Yellow Globe | 31 | 1,855 | 26 | 1,790 | 29 | 1,280 | 23 | 340 | 19 | 808 | 15 | 1,944 | 11 | 1,628 | 13 | 1,324 | 27 | 1,264 | 25 | 600 | 24 | 167 | 21 | |
| 12 | Prize Mamm. Long Red | 31 | 1,690 | 25 | 655 | 27 | 720 | 21 | 1,320 | 25 | 424 | 15 | 1,944 | 10 | 1,120 | 12 | 1,476 | 29 | 1,136 | 23 | 1,960 | 24 | 1,818 | 19 | 1,871 |
| 13 | Golden Fleshed Tankard | 30 | 1,050 | 21 | 240 | 26 | 1,200 | 18 | 1,240 | 13 | 400 | 11 | 1,760 | 9 | 1,404 | 13 | 1,852 | 29 | 1,140 | 35 | 400 | 23 | 1,839 | 20 | 298 |
| 14 | Warden Orange Globe | 29 | 1,730 | 27 | 835 | 24 | 1,540 | 23 | 340 | 14 | 1,832 | 12 | 816 | 8 | 896 | 11 | 1,628 | 19 | 1,424 | 18 | 80 | 19 | 1,084 | 18 | 1,140 |
| 15 | Giant Yellow Half Long | 29 | 740 | 19 | 1,765 | 33 | 840 | 25 | 300 | 15 | 1,994 | 18 | 112 | 10 | 1,912 | 14 | 1,568 | 31 | 1,360 | 28 | 672 | 24 | 569 | 21 | 483 |
| 16 | Ward's Large Oval Shaped | 28 | 155 | 19 | 280 | 30 | | 19 | 1,520 | 18 | 1,488 | 19 | 1,336 | 9 | 480 | 13 | 268 | 28 | 496 | 22 | 1,760 | 22 | 1,724 | 18 | 1,833 |
| 17 | Giant Yellow Intermediate (Pearce) | 25 | 1,535 | 16 | 395 | .... | .... | .... | .... | .... | .... | .... | .... | 9 | 216 | 13 | 664 | 27 | 912 | 26 | 624 | 20 | 1,554 | 18 | 1,228 |
| 18 | Norbiton Giant | 19 | 1,325 | 10 | 130 | 34 | 400 | 23 | 360 | 20 | 1,976 | 23 | 1,256 | 11 | 1,760 | 12 | 420 | 35 | 1,456 | 34 | 1,960 | 24 | 983 | 20 | 1,625 |

Selected Mammoth Long Red and Giant Yellow Intermediate were omitted at Nappan, and Giant Yellow Intermediate at Brandon.

The crops from the successive sowings of Mangels at the experimental farms have averaged as follows:

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., first sowing | 33 | 323 |
| do do do second sowing | 24 | 635 |
| Experimental Farm, Nappan, N. S., first sowing | 28 | 404 |
| do do second sowing | 21 | 706 |
| do Brandon, Man., first sowing | 18 | 3 |
| Experimental Farm, Brandon, Man., second sowing | 16 | 1,742 |
| do Indian Head, N. W. T., first sowing | 9 | 1,991 |
| do do do second sowing | 12 | 1,589 |
| do Agassiz, B. C., first sowing | 31 | 975 |
| do do second sowing | 28 | 895 |

Average crop from all the plots at all the farms: First sowing, 24 tons 208 lbs.; second sowing, 20 tons 1,756 lbs.

In the case of the mangels also, the early sown plots have given the larger crops. Taking the earlier sowings at all the experimental farms, they have given an average of 3 tons, 1,452 lbs. per acre more than that obtained from the later sowings.

The six varieties of mangels which have given the heaviest crops at the several experimental farms during 1897 are the following. Where not otherwise stated the quantities given are all from the early sown plots:

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate | 46 | 1,060 | 4. Golden Tankard | 35 | 950 |
| 2. Gate Post | 44 | 1,815 | 5. Mamm. Long Red | 34 | 1,960 |
| 3. Canadian Giant | 40 | 1,345 | 6. Champion Yellow Globe | 34 | 1,630 |

An average crop of 39 tons 1,127 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate | 34 | 400 | 4. Ward's Large Oval-shaped | 30 | |
| 2. Norbiton Giant | 34 | 400 | 5. Yellow Intermediate | 29 | 1,280 |
| 3. Giant Yellow Half Long | 33 | 840 | 6. Giant Yellow Globe | 29 | 1,280 |

An average crop of 31 tons 1,700 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Champion Yellow Globe | 26 | 8 | 4. Canadian Giant | 21 | 32 |
| 2. Prize Mamm. Long Red | 25 | 424 | 5. Norbiton Giant | 20 | 1,976 |
| 3. Giant Yellow Intermediate | 22 | 352 | 6. Red Fleshed Globe | 20 | 392 |

An average crop of 22 tons 1,157 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate, 2nd sowing | 15 | 1,944 | 4. Giant Yellow Globe, 2nd sowing | 13 | 1,324 |
| 2. Gate Post, 2nd sowing | 13 | 1,984 | 5. Prize Mamm. Long Red, 2nd sowing | 13 | 268 |
| 3. Golden Fleshed Tankard, 2nd sowing | 13 | 1,852 | 6. Mamm. Long Red, 2nd sowing | 13 | 268 |

An average crop of 13 tons 1,540 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Mamm. Long Red | 39 | 1,024 | 4. Gate Post, 2nd sowing | 36 | 160 |
| 2. Red Fleshed Tankard | 39 | 320 | 5. Norbiton Giant | 35 | 1,456 |
| 3. Golden Fleshed Tankard | 39 | 140 | 6. Canadian Giant | 35 | 752 |

An average crop of 37 tons 975 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops, taking the average of the results obtained at all the experimental farms are the following :

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate. | 29 | 1,202 | 4. Gate Post. ... ........... | 26 | 1,041 |
| 2. Selected Mamm. Long Red. | 26 | 1,863 | 5. Champion Yellow Globe..... | 25 | 350 |
| 3. Canadian Giant........ ... | 26 | 1,103 | 6. Prize Mamm. Long Red..... | 24 | 1,818 |

An average crop of 26 tons 1,229 lbs. per acre.

## CARROTS.

Fifteen varieties of carrots were under test during 1897. all sown in drills or on the flat from $1\frac{1}{2}$ to 2 feet apart. Two sowings were made in each case, the second sowing about two weeks after the first. The dates of sowing will be found in the accompanying table ; the dates on which the roots were pulled were the following :—At Ottawa, 11th October ; Nappan, 14th and 15th October ; Brandon, 30th September ; Indian Head, 6th October ; and at Agassiz, 15th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all the Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | | Sown May 21. | | Sown June 4. | | Sown June 18. | | Sown May 20. | | Sown June 3. | | Sown May 14. | | Sown May 27. | | Sown April 23. | | Sown May 7. | | First Sowing. | | Second Sowing. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Mam. White Intermediate | 24 | 180 | 19 | 445 | 16 | 1,440 | 14 | 100 | 3 | 600 | 3 | 1,480 | 3 | 1,128 | 3 | 1,128 | 26 | 800 | 16 | 1,440 | 14 | 1,630 | 11 | 919 |
| 2 | Green Top White Orthe... | 23 | 1,850 | 20 | 95 | 18 | 1,240 | 12 | 320 | 4 | 360 | 3 | 600 | 3 | 600 | 2 | 1,016 | 33 | 880 | 26 | 800 | 16 | 1,386 | 12 | 1,766 |
| 3 | Giant White Vosges...... | 23 | 200 | 19 | 940 | 21 | 560 | 16 | 680 | 3 | 600 | 5 | 1,440 | 2 | 1,544 | 3 | 1,392 | 37 | 1,680 | 46 | 200 | 17 | 1,317 | 18 | 530 |
| 4 | Iverson's Champion ...... | 21 | 1,230 | 16 | 1,000 | 21 | 1,320 | 13 | 580 | 3 | 600 | 5 | 1,000 | 3 | 996 | 4 | 448 | 27 | 120 | 36 | 1,060 | 15 | 853 | 15 | 418 |
| 5 | Improved Short White ... | 21 | 570 | 21 | 240 | 17 | 960 | 16 | 680 | 1 | 1,080 | 3 | 160 | 3 | 1,524 | 3 | 468 | 33 | 1,467 | 30 | 1,892 | 15 | 1,120 | 15 | 176 |
| 6 | Half Long White......... | 20 | 1,305 | 17 | 980 | 16 | 680 | 12 | 1,840 | 2 | 840 | 4 | 1,240 | 3 | 204 | 3 | 864 | 31 | 87 | 22 | 1,760 | 14 | 1,423 | 12 | 537 |
| 7 | Half Long Chantenay .... | 19 | 1,270 | 14 | 1,810 | 17 | 960 | 12 | 320 | 2 | 400 | 2 | 406 | 3 | 72 | 3 | 1,524 | 26 | 1,960 | 24 | 688 | 13 | 1,732 | 11 | 948 |
| 8 | Guerande or Ox Heart.... | 19 | 5 | 12 | 475 | 16 | 1,440 | 11 | 40 | 1 | 640 | 2 | 400 | 3 | 600 | 3 | 204 | 27 | 1,560 | 20 | 480 | 13 | 1,249 | 9 | 1,520 |
| 9 | Early Gem............ | 18 | 1,345 | 14 | 1,755 | 13 | 1,360 | 14 | 100 | 2 | 840 | 3 | 1,480 | 2 | 1,412 | 2 | 1,808 | 30 | 1,600 | 29 | 1,840 | 13 | 1,311 | 13 | 197 |
| 10 | White Belgian ......... | 18 | 740 | 15 | 1,680 | 13 | 1,360 | 10 | 1,280 | 2 | 1,720 | 3 | 160 | 3 | 852 | 3 | 1,392 | 30 | 1,600 | 23 | 53 | 13 | 1,654 | 11 | 513 |
| 11 | Yellow Intermediate ..... | 17 | 45 | 15 | 195 | 16 | 1,440 | 8 | 1,280 | 2 | 400 | 3 | 1,920 | 2 | 1,016 | 2 | 1,676 | 39 | 1,200 | 27 | 267 | 15 | 1,220 | 11 | 1,068 |
| 12 | Carter's Orange Giant ... | 13 | 400 | 10 | 1,505 | 9 | 1,000 | 7 | 1,760 | 1 | 640 | 2 | 1,280 | 2 | 1,016 | 3 | 72 | 31 | 1,360 | 23 | 1,040 | 11 | 1,283 | 9 | 1,131 |
| 13 | Long Orange or Surrey ... | 11 | 1,595 | 10 | 625 | 9 | 240 | 7 | 1,760 | 1 | 1,520 | 3 | 160 | 2 | 752 | 2 | 620 | 18 | 760 | 21 | 240 | 8 | 1,373 | 8 | 1,881 |
| 14 | Scarlet Intermediate...... | 9 | 1,140 | 7 | 1,510 | 11 | 800 | 7 | 100 | 1 | 1,520 | 3 | 1,920 | 2 | 1,016 | 2 | 356 | 11 | 880 | 13 | 1,280 | 7 | 671 | 6 | 1,833 |
| 15 | Long Scarlet Altringham . | 8 | 1,490 | 8 | 1,380 | 9 | 1,000 | 8 | 520 | — | 1,760 | 3 | 160 | 1 | 1,960 | 1 | 1,076 | 19 | 1,600 | 17 | 1,787 | 8 | 362 | 7 | 1,785 |

The crops from the successive sowings of carrots at the experimental farms have averaged as follows :—

| | | | |
|---|---|---|---|
| Central Experimental Farm, Ottawa, Ont., first sowing....... | 18 tons 91 lbs. | Experimental Farm, Indian Head, N.W.T., first sowing....... | 2 tons 1,913 lbs. |
| do do do second sowing .... | 14 do 1,909 do | do do do second sowing .... | 3 do 136 do |
| Experimental Farm, Nappan, N.S., first sowing.............. | 15 do 653 do | do Agassiz, B.C., first sowing.............. | 28 do 904 do |
| do do second sowing......... | 11 do 1,024 do | do do second sowing............ | 25 do 722 do |
| do Brandon, Man., first sowing ........... | 2 do 635 do | Average crop from all the plots at all the farms, first sowing ... | 13 do 839 do |
| do do second sowing........ : | 3 do 1,187 do | do do do second sowing . | 11 do 1,396 do |

The carrots have also given the larger crops from the early sown plots. Taking the average yield of the carrot plots on all the farms, the crops from the early sowings have exceeded those from the plots sown later by 1 ton 1,443 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops at the several experimental farms are the following. Unless otherwise stated the yields given are all from the earliest sown plots :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate. | 24 | 180 | 4. Iverson's Champion ......... | 21 | 1,230 |
| 2. Green Top White Orthe..... | 23 | 1,850 | 5. Improved Short White...... | 21 | 570 |
| 3. Giant White Vosges......... | 23 | 200 | 6. Half-long White ............ | 20 | 1,305 |

An average crop of 22 tons, 889 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Iverson's Champion......... | 21 | 1,320 | 4. Half-long Chantenay...... | 17 | 960 |
| 2. Giant White Vosges ........ | 21 | 560 | 5. Improved Short White...... | 17 | 960 |
| 3. Green Top White Orthe...... | 18 | 1,820 | 6. Yellow Intermediate........ | 16 | 1,440 |

An average crop of 18 tons 1,843 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant White Vosges, 2nd sowing...................... | 5 | 1440 | 4. White Green Top Orthe..... | 4 | 360 |
| 2. Iverson's Champion, 2nd sowing ...................... | 5 | 1,000 | 5. Yellow Intermediate, 2nd sowing .................. | 3 | 1,920 |
| 3. Half-long White, 2nd sowing | 4 | 1,240 | 6. Scarlet Intermediate, 2nd sowing .................. | 3 | 1,920 |

An average crop of 4 tons 1,313 lbs. per acre.

EXPERIMENTAL FARM FOR THE N.W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Iverson's Champion, 2nd sowing........................ | 4 | 448 | 4. Giant White Vosges, 2nd sowing .... ............ | 3 | 1,392 |
| 2. Improved Short White...... | 3 | 1,524 | 5. White Belgian, 2nd sowing.. | 3 | 1,392 |
| 3. Half-long Chantenay, 2nd sowing .................. | 3 | 1,524 | 6. Mamm. White Intermediate. | 3 | 1,128 |

An average crop of 3 tons 1,568 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant White Vosges, 2nd sowing .................. | 46 | 200 | 4. Improved Short White ...... | 33 | 1,467 |
| 2. Yellow Intermediate........ | 39 | 1,200 | 5. Green Top White Orthe..... | 33 | 880 |
| 3. Iverson's Champion, 2nd sowing................ ..... | 36 | 1,060 | 6. Carter's Orange Giant. . ... | 31 | 1,360 |

An average crop of 36 tons 1,688 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops, taking the average of the results obtained at all the experimental farms, are :—

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Giant White Vosges | 18 | 490 |
| 2. Green Top White Orthe | 16 | 1,386 |
| 3. Yellow Intermediate | 15 | 1,220 |
| 4. Improved Short White | 15 | 1,120 |
| 5. Iverson's Champion | 15 | 853 |
| 6. Mamm. White Intermediate | 14 | 1,630 |

An average crop of 16 tons 115 lbs. per acre.

## SUGAR BEETS.

Five varieties of sugar beets have been tested during 1897, sown in drills or on the flat from 2 to 2½ feet apart. Two sowings were made in each case, the second sowing about two weeks after the first. The dates of sowing will be found in the accompanying table; the dates on which the roots were pulled were the following :—At Ottawa, 11th October; Nappan, 14th and 15th October; Brandon, 30th September; Indian Head, 4th October; and at Agassiz, 15th October. The yield per acre in each instance has been calculated from the weight of roots gathered from two rows, each 66 feet long.

# UNIFORM TEST PLOTS OF SUGAR BEETS.

| Number. | Name of Variety. | Ottawa, Ont. Sown May 8. | | Ottawa, Ont. Sown May 21. | | Nappan, N.S. Sown June 4. | | Nappan, N.S. Sown June 18. | | Brandon, Man. Sown May 20. | | Brandon, Man. Sown June 3. | | Indian Head, N.W.T. Sown May 18. | | Indian Head, N.W.T. Sown May 28. | | Agassiz, B.C. Sown April 26. | | Agassiz, B.C. Sown May 10. | | Average of all Farms. First Sowing. | | Average of all Farms. Second Sowing. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Improved Imperial.... | 23 | 90 | 15 | 30 | 20 | 1,040 | 15 | 400 | 15 | 1,680 | 13 | 1,192 | 9 | 1,140 | 8 | 1,292 | 13 | 1,720 | 13 | 1,280 | 16 | 1,134 | 13 | 439 |
| 2 | Danish Improved...... | 19 | 5 | 13 | 1,060 | 22 | 1,600 | 15 | 1,920 | 13 | 928 | 20 | 392 | 10 | 1,252 | 11 | 308 | 14 | 952 | 13 | 1,104 | 16 | 147 | 14 | 1,757 |
| 3 | Red Top Sugar.... .. | 18 | 1,620 | 16 | 1,110 | 22 | 1,600 | 16 | 1,440 | 20 | 1,184 | 16 | 1,792 | 9 | 1,932 | 12 | 1,740 | 12 | 1,000 | 15 | 800 | 16 | 1,867 | 15 | 1,374 |
| 4 | Wanzleben......... .. | 18 | 1,015 | 14 | 1,205 | 22 | 840 | 14 | 1,640 | 11 | 176 | 13 | 1,720 | 8 | 632 | 11 | 704 | 14 | 1,040 | 13 | 1,456 | 14 | 1,941 | 13 | 1,345 |
| 5 | Vilmorin's Improved... | 15 | 1,680 | 15 | 745 | 15 | 1,160 | 14 | 120 | 20 | 656 | 10 | 1,120 | 7 | 1,180 | 7 | 1,120 | 13 | 400 | 12 | 1,520 | 14 | 1,015 | 12 | 125 |

The crop from the successive sowings of sugar beets at the experimental farms have averaged as follows:—

| | | | Tons. | Lbs. |
|---|---|---|---|---|
| Central Experimental Farm, Ottawa, Ont., | 1st | sowing | 19 | 82 |
| " " " | 2nd | " | 15 | 30 |
| Experimental Farm, Nappan, N.S. | 1st | " | 20 | 1,648 |
| " " | 2nd | " | 15 | 704 |
| " Brandon, Man. | 1st | " | 16 | 525 |
| " " | 2nd | " | 15 | 43 |
| " Indian Head, N.W.T. | 1st | " | 9 | 427 |
| " " | 2nd | " | 10 | 633 |
| " Agassiz, B.C. | 1st | " | 13 | 1,422 |
| " " | 2nd | " | 13 | 1,632 |

Average crop from all the plots on all the farms, first sowing, 15 tons 1,621 lbs.; second sowing, 13 tons 1,808 lbs.

The four varieties of sugar beets which have produced the heaviest crops at the several experimental farms during 1897, are the following—where not otherwise stated the crops grown are from the first sowing:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial | 23 | 90 | 3. Danish Improved | 19 | 5 |
| 2. Danish Red Top | 20 | 1,745 | 4. Red Top Sugar | 18 | 1,620 |

An average crop of 20 tons 865 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved | 22 | 1,600 | 3. Wanzleben | 22 | 840 |
| 2. Red Top Sugar | 22 | 1,600 | 4. Improved Imperial | 20 | 1,040 |

An average crop of 22 tons 270 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar | 20 | 1,184 | 3. Danish Improved, 2nd sowing | 20 | 392 |
| 2. Vilmorin's Improved | 20 | 656 | 4. Improved Imperial | 15 | 1,680 |

An average crop of 19 tons 478 lbs. per acre.

EXPERIMENTAL FARM FOR THE N.W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar, 2nd sowing. | 12 | 1,740 | 3. Danish Improved, 2nd sowing | 11 | 308 |
| 2. Wanzleben " | 11 | 704 | 4. Improved Imperial | 9 | 1,140 |

An average crop of 11 tons 473 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar, 2nd sowing. | 15 | 800 | 3. Danish Improved | 14 | 952 |
| 2. Wanzleben " | 14 | 1,040 | 4. Improved Imperial | 13 | 1,720 |

An average crop of 14 tons 1,128 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops taking the average of the results obtained at all the experimental farms are the following:—

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar | 16 | 1,857 | 3. Danish Improved | 16 | 147 |
| 2. Improved Imperial | 16 | 1,134 | 4. Wanzleben | 14 | 1,941 |

An average of 16 tons 270 lbs. per acre.

## POTATOES.

Ninety-eight varieties of potatoes have been under trial in uniform test plots during 1897. The potatoes for planting were cut into pieces with two or three eyes in each, and these were planted in rows 26 to 30 inches apart, the sets being placed a foot apart in the rows. The dates of planting

and digging were the following:—At Ottawa, planted 21st and 22nd May, dug from 4th to 7th October; Nappan, planted 25th May, dug 1st to 11th October; Brandon, planted 21st May, dug 29th September; Indian Head, planted 17th May, dug 4th October; and at Agassiz, planted 4th to 28th May, and dug 18th to 25th September. The yield per acre has been calculated in each case from the weight of tubers gathered from two rows, each 66 feet long.

UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Yields at the Several Experimental Farms, Season of 1897. Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all the Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs | Bush. | Lbs |
| 1 | Holborn Abundance. | 402 | 36 | 412 | 30 | 73 | 20 | 255 | 12 | 418 | .. | 312 | 20 |
| 2 | Seedling No. 230 .... | 400 | 24 | 390 | .. | 183 | 20 | 314 | 16 | 355 | 40 | 328 | 44 |
| 3 | Seedling No. 7 ...... | 381 | 42 | 400 | .. | 220 | .. | 292 | 36 | 535 | 20 | 365 | 55 |
| 4 | Irish Daisy.......... | 372 | 54 | 277 | 30 | . | .... | 262 | .. | 591 | 36 | 376 | .. |
| 5 | Chicago Market..... | 356 | 24 | 245 | .. | 238 | 20 | .......... | | 360 | 10 | 299 | 58 |
| 6 | Dreer's Standard.... | 346 | 38 | 290 | .. | 242 | .. | 266 | 12 | 419 | 48 | 312 | 56 |
| 7 | Earliest of All...... | 346 | 30 | 240 | .. | 179 | 40 | .......... | | 319 | 44 | 271 | 28 |
| 8 | Northern Spy...... | 346 | 30 | 300 | .. | 187 | .. | 530 | 24 | 408 | 18 | 354 | 26 |
| 9 | Rose No. 9.......... | 338 | 48 | .......... | | 121 | .. | 127 | 36 | 513 | 20 | 275 | 11 |
| 10 | Reeve's Rose....... | 336 | 36 | 315 | .. | 341 | .. | 231 | .. | 481 | 4 | 340 | 56 |
| 11 | Vanier............. | 333 | 18 | 255 | .. | 176 | .. | 173 | 48 | 506 | .. | 288 | 49 |
| 12 | Daisy ............. | .332 | 37 | 275 | .. | 51 | 20 | 217 | 48 | 293 | 20 | 234 | 1 |
| 13 | Irish Cobbler........ | 321 | 12 | 317 | 30 | 231 | .. | 156 | 12 | 305 | 4 | 266 | 12 |
| 14 | Flemish Beauty Seedling ............ | 315 | 42 | 177 | 30 | 304 | 20 | 310 | .. | 352 | 30 | 292 | .. |
| 15 | London............. | 315 | 42 | 265 | .. | 124 | 40 | .......... | | 344 | 20 | 262 | 25 |
| 16 | Everett........ .... | 311 | 18 | 320 | .. | 260 | 20 | 129 | 48 | 358 | 36 | 276 | .. |
| 17 | Early Sunrise........ | 309 | 47 | 280 | .. | 146 | 40 | 288 | 12 | 528 | .. | 310 | 32 |
| 18 | Reading Giant ...... | 302 | 30 | 287 | 30 | 315 | 20 | 160 | 36 | 481 | 4 | 309 | 24 |
| 19 | Sharpe's Seedling.... | 300 | 18 | 295 | .. | 198 | .. | 156 | 12 | 334 | 24 | 256 | 47 |
| 20 | Troy Seedling....... | 297 | 44 | 362 | 30 | 190 | 40 | 100 | .. | 457 | 36 | 281 | 42 |
| 21 | Delaware ........... | 296 | 33 | 245 | .. | 201 | 40 | 151 | 48 | 303 | 36 | 239 | 44 |
| 22 | Charles Downing.... | 292 | 36 | 290 | .. | 198 | .. | 286 | .. | 469 | 20 | 307 | 11 |
| 23 | Late Puritan.... ... | 287 | 22 | 295 | .. | 253 | .. | 169 | 24 | 536 | 48 | 308 | 19 |
| 24 | Wonder of the World. | 287 | 6 | 295 | .. | 190 | 40 | 215 | 36 | 234 | 40 | 244 | 36 |
| 25 | New Variety No. 1. | 284 | 21 | 275 | .. | 363 | .. | 301 | 24 | 409 | 36 | 326 | 40 |
| 26 | State of Maine...... | 283 | 15 | 347 | 30 | 209 | .. | 290 | 24 | 440 | .. | 314 | 2 |
| 27 | Early Six Weeks.... | 280 | 22 | 285 | .. | 183 | 20 | .......... | | 205 | 20 | 238 | 30 |
| 28 | Crown Jewel........ | 280 | 8 | 272 | 30 | 179 | 40 | 145 | 12 | 352 | 30 | 246 | .. |
| 29 | Seattle ............ | 278 | 34 | 377 | 30 | 201 | 40 | 129 | 48 | 315 | 20 | 260 | 34 |
| 30 | Clarke's No. 1....... | 278 | 18 | 412 | 30 | 289 | 40 | 330 | .. | 528 | .. | 367 | 42 |
| 31 | Early Ohio. ........ | 277 | 53 | 325 | .. | 73 | 20 | 134 | 12 | 228 | 48 | 207 | 51 |
| 32 | Vick s Extra Early.. | 269 | 30 | 287 | 30 | 71 | .. | 389 | 24 | 414 | .. | 286 | 17 |
| 33 | White Beauty....... | 268 | 24 | 215 | .. | 179 | 40 | 325 | 36 | 238 | 48 | 245 | 30 |
| 34 | Lightning Express... | 268 | 24 | 320 | .. | 44 | .. | .......... | | 286 | .. | 229 | 36 |
| 35 | McKenzie ........... | 267 | 18 | 345 | .. | 216 | 20 | 222 | 12 | 363 | 44 | 282 | 55 |
| 36 | Great Divide ....... | 266 | 12 | 320 | .. | 256 | 40 | .......... | | 407 | 14 | 312 | 31 |
| 37 | Green Mountain..... | 266 | 12 | 315 | .. | 194 | 20 | .......... | | 300 | 40 | 269 | 3 |
| 38 | American Wonder... | 266 | 12 | 275 | .. | 212 | 40 | 290 | 24 | 598 | 24 | 328 | 32 |
| 39 | Early Rose.......... | 265 | 31 | 380 | .. | 198 | .. | 198 | .. | 290 | 24 | 266 | 23 |
| 40 | Carman No. 1....... | 265 | 22 | 335 | .. | 201 | 40 | 129 | 48 | 299 | 12 | 246 | 12 |
| 41 | Dakota Red ........ | 264 | .. | 360 | .. | 183 | 20 | 305 | 48 | 445 | 52 | 311 | 48 |
| 42 | Hale's Champion.... | 264 | .. | 292 | 20 | 249 | 20 | 207 | .. | 284 | 32 | 259 | 28 |
| 43 | Money Maker....... | 264 | .. | 305 | .. | 209 | .. | .......... | | 330 | .. | 277 | .. |
| 44 | Early Gem.......... | 261 | 48 | 310 | .. | 194 | 20 | 248 | 12 | 271 | 20 | 257 | 8 |
| 45 | American Giant..... | 261 | 31 | .......... | | 143 | .. | .......... | | 374 | .. | 259 | 30 |
| 46 | Lizzie's Pride........ | 260 | 42 | 325 | .. | 256 | 40 | 283 | 48 | 249 | 20 | 275 | 6 |
| 47 | Freeman............ | 260 | 42 | 377 | 30 | 110 | .. | .......... | | 271 | 20 | 254 | 53 |

UNIFORM TEST PLOTS OF POTATOES—*Continued.*

| Number. | Name of Variety. | Yields at the several Experimental Farms, Season of 1897. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all the Farms. | |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| 48 | Burpee's Extra Early | 259 | 36 | 370 | .. | 198 | .. | 129 | 48 | 228 | 48 | 237 | 14 |
| 49 | Algoma No. 1 | 258 | 22 | 275 | .. | 139 | 20 | 224 | 24 | 418 | .. | 263 | 1 |
| 50 | Ideal | 255 | 12 | 350 | .. | 179 | 40 | .......... | | 334 | 24 | 279 | 49 |
| 51 | Early White Prize | 254 | 39 | 252 | 30 | 124 | 40 | 363 | .. | 316 | 48 | 262 | 19 |
| 52 | Russell's Seedling | 253 | .. | 307 | 30 | 205 | 20 | 180 | .. | .......... | | 236 | 27 |
| 53 | Thorburn | 251 | 54 | 265 | — | 139 | 20 | .......... | | 296 | 22 | 238 | 9 |
| 54 | Early Harvest | 250 | 48 | 307 | 30 | 172 | 20 | 158 | 24 | 253 | 28 | 228 | 30 |
| 55 | Lee's Favourite | 248 | 36 | 412 | 30 | 88 | — | 530 | 24 | 403 | 20 | 336 | 34 |
| 56 | Polaris | 248 | 36 | 182 | 30 | 154 | — | 268 | 24 | 297 | 44 | 230 | 15 |
| 57 | Columbus | 244 | 12 | 292 | 30 | 165 | — | 224 | 24 | 418 | — | 268 | 49 |
| 58 | King of the Roses | 244 | 12 | 240 | — | 245 | 40 | 79 | — | 256 | 40 | 213 | 6 |
| 59 | Record | 243 | 6 | 325 | — | 88 | — | 211 | 12 | 330 | — | 239 | 28 |
| 60 | Rochester Rose | 242 | — | 312 | 30 | 154 | — | .......... | | 322 | 40 | 257 | 47 |
| 61 | Early Norther | 240 | 54 | 217 | 30 | 176 | — | 277 | 12 | 408 | 18 | 263 | 59 |
| 62 | Prize Taker | 238 | 42 | 195 | — | 71 | — | 246 | 24 | 528 | — | 255 | 49 |
| 63 | Quaker City | 237 | 36 | 327 | 30 | 201 | 40 | 272 | 48 | 360 | 10 | 279 | 57 |
| 64 | Bill Nye | 237 | 36 | 295 | — | 132 | — | 77 | — | 419 | 28 | 232 | 13 |
| 65 | Pride of the Table | 237 | 3 | 275 | — | 168 | 40 | .......... | | 451 | 44 | 283 | 7 |
| 66 | Beauty of Hebron | 235 | 40 | 222 | 30 | 95 | 20 | 127 | 36 | 303 | 36 | 196 | 56 |
| 67 | Burnaby Seedling | 234 | 1 | 322 | 30 | 161 | 20 | 105 | 36 | 302 | 8 | 225 | 7 |
| 68 | Brown's Rot Proof | 233 | 45 | 295 | — | 249 | 20 | .......... | | 454 | 40 | 308 | 11 |
| 69 | Satisfaction | 233 | 12 | 225 | — | 176 | — | 211 | 12 | 457 | 36 | 260 | 36 |
| 70 | Monroe County | 232 | 6 | 285 | — | 194 | 20 | .......... | | 462 | — | 293 | 21 |
| 71 | Fillbasket | 231 | — | 300 | — | 124 | 40 | 198 | — | 244 | 36 | 219 | 39 |
| 72 | Pride of the Market | 224 | 24 | 262 | 30 | 253 | — | 220 | — | 354 | 12 | 262 | 49 |
| 73 | Early Puritan | 223 | 18 | 460 | — | 172 | 20 | 246 | 24 | 528 | — | 326 | — |
| 74 | Victor Rose | 218 | 54 | 250 | — | 165 | — | 257 | 24 | 308 | — | 239 | 52 |
| 75 | New Queen | 218 | 46 | 265 | — | 110 | — | .......... | | 411 | — | 251 | 11 |
| 76 | Queen of the Valley | 218 | 37 | 317 | 30 | 183 | 20 | .......... | | 281 | 36 | 250 | 16 |
| 77 | Honeoye Rose | 217 | 48 | 250 | — | 22 | — | .......... | | 322 | 40 | 203 | 7 |
| 78 | Harbinger | 216 | 50 | 267 | 30 | 113 | 40 | 169 | 24 | 176 | — | 188 | 41 |
| 79 | Rural No. 2 | 216 | 42 | 335 | — | 91 | 40 | .......... | | 308 | — | 237 | 50 |
| 80 | Pearce's Extra Early | 216 | 1 | 170 | — | 146 | 40 | .......... | | 414 | — | 236 | 40 |
| 81 | Maggie Murphy | 216 | 25 | 315 | — | 106 | 20 | 226 | 36 | 205 | 20 | 213 | 56 |
| 82 | World's Fair | 214 | 55 | 270 | — | 176 | — | 387 | 12 | 454 | 40 | 300 | 33 |
| 83 | Hopeful | 213 | 49 | 295 | — | 223 | 40 | 125 | 24 | 256 | 40 | 222 | 55 |
| 84 | Empire State | 211 | 53 | 252 | 30 | 194 | 20 | 213 | 24 | 498 | 40 | 274 | 9 |
| 85 | Rural Blush | 211 | 12 | 272 | 30 | 146 | 40 | 231 | 24 | 322 | 40 | 236 | 53 |
| 86 | Good News | 209 | — | 345 | — | 168 | 40 | 123 | 12 | 352 | 30 | 239 | 40 |
| 87 | Ohio Junior | 209 | — | 175 | — | 71 | — | 321 | 12 | 403 | 20 | 235 | 54 |
| 88 | Clay Rose | 206 | 48 | 192 | 30 | 88 | — | .......... | | 633 | 36 | 280 | 13 |
| 89 | Carman No. 3 | 202 | 24 | 360 | — | 88 | — | 451 | — | 447 | 20 | 309 | 45 |
| 90 | Brownell's Winner | 202 | 24 | 312 | 30 | 168 | 40 | 330 | — | 563 | 12 | 315 | 21 |
| 91 | Peerless Junior | 187 | — | 352 | — | 161 | 20 | .......... | | 362 | 16 | 265 | 39 |
| 92 | Houlton Rose | 184 | 48 | 220 | — | 238 | 20 | 226 | — | 322 | 40 | 238 | 22 |
| 93 | Table King | 182 | 36 | 215 | — | 14 | 40 | 92 | 24 | 176 | — | 136 | 8 |
| 94 | I. X. L. | 179 | 18 | 400 | — | 102 | 40 | 316 | 48 | 264 | — | 252 | 33 |
| 95 | General Gordon | 176 | 16 | 345 | — | 264 | — | .......... | | 225 | 22 | 252 | 39 |
| 96 | Stourbridge Glory | 161 | 42 | 235 | — | 102 | 40 | 204 | 36 | .......... | | 175 | 59 |
| 97 | Orphans | 149 | 3 | 257 | 30 | 66 | — | 138 | 36 | 294 | 4 | 181 | 3 |
| 98 | Seedling 214 | 139 | 42 | 200 | — | 146 | 40 | 197 | — | 256 | 40 | 188 | — |

The following, which are omitted, failed to germinate or were injured during growth so that they could not be reported on:—At Nappan, Nos. 9, 45; Brandon, No. 4; Indian Head, Nos. 5, 7, 15, 27, 34, 36, 37, 43, 45, 47, 50, 53, 60, 65, 68, 70, 75, 76, 77, 79, 80, 88, 91, 95, and at Agassiz, Nos. 52, 96.

The twelve varieties of potatoes which have produced the heaviest crops at the several experimental farms during 1897 are the following :—

EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holborn Abundance | 402 | 36 | 7. Earliest of All | 346 | 30 |
| 2. Seedling No. 230 | 400 | 24 | 8. Northern Spy | 346 | 30 |
| 3. Seedling No. 7 | 381 | 42 | 9. Rose No. 9 | 338 | 48 |
| 4. Irish Daisy | 372 | 54 | 10. Reeves' Rose | 336 | 36 |
| 5. Chicago Market | 356 | 24 | 11. Vanier | 333 | 18 |
| 6. Dreer's Standard | 346 | 38 | 12. Daisy | 332 | 37 |

An average crop of 357 bushels 55 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Puritan | 460 | .. | 7. Seedling No. 230 | 390 | .. |
| 2. Clarke's No. 1 | 412 | 30 | 8. Early Rose | 380 | .. |
| 3. Lee's Favourite | 412 | 30 | 9. Freeman | 377 | 30 |
| 4. Holborn Abundance | 412 | 30 | 10. Seattle | 377 | 30 |
| 5. I. X. L. | 400 | .. | 11. Burpee's Extra Early | 370 | .. |
| 6. Seedling No. 7 | 400 | .. | 12. Troy Seedling | 362 | 30 |

An average crop of 396 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. New Variety No. 1 | 363 | .. | 7. Everett | 260 | 20 |
| 2. Reeves' Rose | 341 | .. | 8. Great Divide | 256 | 40 |
| 3. Reading Giant | 315 | 20 | 9. Lizzie's Pride | 256 | 40 |
| 4. Flemish Beauty Seedling | 304 | 20 | 10. Late Puritan | 253 | .. |
| 5. Clarke's No. 1 | 289 | 40 | 11. Pride of the Market | 253 | .. |
| 6. General Gordon | 264 | .. | 12. Hale's Champion | 249 | 20 |

An average crop of 283 bushels 52 lbs. per acre.

EXPERIMENTAL FARM FOR THE N. W. TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Lee's Favourite | 530 | 24 | 7. Brownell's Winner | 330 | .. |
| 2. Northern Spy | 530 | 24 | 8. Clarke's No. 1 | 330 | .. |
| 3. Carman No. 3 | 451 | .. | 9. White Beauty | 325 | 36 |
| 4. Vick's Extra Early | 389 | 24 | 10. Ohio Junior | 321 | 12 |
| 5. World's Fair | 387 | 12 | 11. I. X. L. | 316 | 48 |
| 6. Early White Prize | 363 | .. | 12. Seedling No. 230 | 314 | 36 |

An average crop of 382 bushels 28 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Clay Rose | 633 | 36 | 7. Early Sunrise | 528 | .. |
| 2. American Wonder | 598 | 24 | 8. Early Puritan | 528 | .. |
| 3. Irish Daisy | 591 | 36 | 9. Clarke's No. 1 | 528 | .. |
| 4. Brownell's Winner | 563 | 12 | 10. Prize Taker | 528 | .. |
| 5. Late Puritan | 536 | 48 | 11. Rose No. 9 | 513 | 20 |
| 6. Seedling No. 7 | 535 | 20 | 12. Vanier | 506 | .. |

An average crop of 549 bushels 11 lbs. per acre.

The twelve varieties of potatoes which have produced the heaviest crops, taking the average of the results obtained at all the experimental farms, are the following :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Irish Daisy | 376 | .. | 7. Seedling No. 230 | 328 | 44 |
| 2. Clarke's No. 1 | 367 | 42 | 8. American Wonder | 328 | 32 |
| 3. Seedling No. 7 | 365 | 55 | 9. New Variety No. 1 | 326 | 40 |
| 4. Northern Spy | 354 | 26 | 10. Early Puritan | 326 | .. |
| 5. Reeves' Rose | 340 | 56 | 11. Brownell's Winner | 315 | 21 |
| 6. Lee's Favourite | 336 | 34 | 12. State of Maine | 314 | 7 |

An average crop of 340 bushels 5 lbs. per acre.

The average crop of all the varieties of potatoes tested at each of the experimental farms was as follows: At Ottawa, 259 bush. 17 lbs. per acre: Nappan, 295 bush. 8 lbs.; Brandon, 171 bush. 30 lbs.; Indian Head, 230 bush. 55 lbs., and at Agassiz, 366 bush. 55 lbs. The average return given by the whole of the varieties at all the farms was 265 bushels 58 lbs. per acre.

## AVERAGE CROPS FOR THE PAST THREE YEARS.

The results of experimental tests of varieties of grain to gain information as to their relative productiveness and usefulness, are much more reliable as a guide to the selection of the best sorts when the average experience of several years can be given. For the last three years a similar series of test plots to those reported in this bulletin has been conducted under conditions as nearly uniform as it has been possible to secure. The average of the crops obtained are herewith presented.

### THREE YEARS' EXPERIENCE WITH VARIETIES OF OATS.

The twelve varieties of oats which have averaged the heaviest crops at the several experimental farms during the past three years are the following :—

#### Central Experimental Farm, Ottawa.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 68 | 30 | 7. Golden Giant | 63 | 15 |
| 2. Golden Beauty | 65 | 15 | 8. American Beauty | 62 | 12 |
| 3. American Triumph | 65 | 13 | 9. White Schonen | 61 | 28 |
| 4. Columbus | 65 | 12 | 10. Improved Ligowo | 61 | 18 |
| 5. White Russian | 65 | .. | 11. Bavarian | 59 | 22 |
| 6. Abundance | 63 | 23 | 12. Wallis | 58 | 23 |

An average yield of 63 bushels 15 lbs. per acre.

#### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wallis | 74 | 31 | 7. Golden Beauty | 69 | 7 |
| 2. White Russian | 73 | 31 | 8. Early Blossom | 68 | 28 |
| 3. Banner | 71 | 13 | 9. American Beauty | 68 | 21 |
| 4. California Prolific Black | 70 | 7 | 10. Abyssinia | 67 | 15 |
| 5. Columbus | 70 | .. | 11. White Schonen | 67 | 9 |
| 6. Early Gothland | 69 | 13 | 12. Improved Ligowo | 65 | 17 |

An average yield of 69 bushels 24 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 86 | 16 | 7. Golden Beauty | 72 | 22 |
| 2. Early Golden Prolific | 86 | 6 | 8. Rosedale | 71 | 26 |
| 3. American Beauty | 85 | 20 | 9. Bavarian | 69 | 24 |
| 4. Holstein Prolific | 77 | 25 | 10. Improved Ligowo | 69 | 4 |
| 5. Golden Giant | 77 | 15 | 11. Joanette | 69 | 4 |
| 6. White Schonen | 73 | 1 | 12. Columbus | 68 | 11 |

An average yield of 75 bushels 20 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Columbus | 92 | 19 | 7. Improved Ligowo | 84 | 29 |
| 2. Holstein Prolific | 91 | 3 | 8. Wide Awake | 84 | 21 |
| 3. American Beauty | 89 | 1 | 9. Early Archangel | 83 | 14 |
| 4. Abundance | 86 | 33 | 10. Early Golden Prolific | 83 | 8 |
| 5. White Schonen | 85 | 13 | 11. Abyssinia | 81 | 16 |
| 6. Golden Beauty | 85 | 3 | 12. American Triumph | 80 | 27 |

An average yield of 85 bushels 23 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Gothland | 61 | 4 | 7. Columbus | 56 | 9 |
| 2. Lincoln | 60 | 18 | 8. Oderbruch | 56 | 4 |
| 3. Bavarian | 58 | 28 | 9. American Beauty | 55 | 33 |
| 4. Early Golden Prolific | 58 | 16 | 10. Bonanza | 55 | 31 |
| 5. Golden Giant | 57 | 5 | 11. Hazlett's Seizure | 55 | 23 |
| 6. Early Blossom | 57 | 4 | 12. Banner | 55 | 22 |

An average yield of 57 bushels 14 lbs. per acre.

The twelve varieties which have produced the largest average crops for the past three years on all the farms, and hence may perhaps be regarded as worthy of being placed at the head of the list for general cultivation are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Beauty | 72 | 10 | 7. Holstein Prolific | 67 | 18 |
| 2. Banner | 72 | 7 | 8. Improved Ligowo | 66 | 18 |
| 3. Columbus | 70 | 15 | 9. White Russian | 65 | 25 |
| 4. Golden Beauty | 69 | 1 | 10. Wallis | 65 | 18 |
| 5. White Schonen | 68 | 7 | 11. Bavarian | 64 | 33 |
| 6. Early Golden Prolific | 67 | 26 | 12. Early Gothland | 64 | 22 |

An average yield of 67 bushels 32 lbs. per acre.

The Abundance, which is also a very promising oat, averaged 64 bushels 17 lbs. per acre, within five lbs. per acre of the Early Gothland.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF BARLEY.

### Two-Rowed Barley.

The six varieties of two-rowed barley which have averaged the heaviest crops at the several experimental farms during the past three years are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Sidney | 41 | 39 | 4. Canadian Thorpe | 37 | 47 |
| 2. Newton | 40 | 25 | 5. Beaver | 37 | 37 |
| 3. Bolton | 39 | 18 | 6. Danish Chevalier | 37 | 27 |

An average yield of 39 bushels 8 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 38 | 16 | 4. Canadian Thorpe | 35 | .. |
| 2. Danish Chevalier | 36 | 12 | 5. Bolton | 33 | 9 |
| 3. Prize Prolific | 35 | 13 | 6. Newton | 32 | 37 |

An average yield of 35 bushels 6 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 48 | 46 | 4. Thanet | 40 | 27 |
| 2. Sidney | 48 | 9 | 5. Canadian Thorpe | 38 | 6 |
| 3. Newton | 42 | 1 | 6. Beaver | 37 | 47 |

An average yield of 42 bushels 31 lbs. per acre.

### Experimental Farm for the N. W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 60 | 23 | 4. Danish Chevalier | 55 | 47 |
| 2. Beaver | 57 | 3 | 5. Newton | 55 | 46 |
| 3. Canadian Thorpe | 56 | 4 | 6. Prize Prolific | 53 | 33 |

An average yield of 56 bushels 26 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Thorpe | 40 | 20 | 4. Kinver Chevalier | 35 | 44 |
| 2. French Chevalier | 39 | 41 | 5. Beaver | 33 | 46 |
| 3. Danish Chevalier | 36 | 45 | 6. Prize Prolific | 31 | 32 |

An average yield of 36 bushels 22 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest average crops for the past three years on all the farms are:—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 44 | 25 | 4. Newton | 39 | 40 |
| 2. Canadian Thorpe | 41 | 25 | 5. Beaver | 39 | 34 |
| 3. Danish Chevalier | 40 | 42 | 6. Sidney | 39 | 14 |

An average yield of 40 bushels 46 lbs. per acre.

## Six-Rowed Barley.

The six varieties of six-rowed barley which have averaged the heaviest crops at the several experimental farms during the past three years are:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 56 | 44 | 4. Trooper | 51 | 27 |
| 2. Mensury | 56 | 9 | 5. Oderbruch | 47 | 47 |
| 3. Royal | 53 | 39 | 6. Petschora | 47 | 6 |

An average yield of 52 bushels 12 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 52 | 37 | 4. Oderbruch | 41 | 45 |
| 2. Surprise | 46 | 5 | 5. Success | 41 | 29 |
| 3. Trooper | 43 | 36 | 6. Vanguard | 41 | 18 |

An average yield of 44 bushels 28 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 54 | 11 | 4. Nugent | 51 | 32 |
| 2. Common | 53 | 43 | 5. Surprise | 47 | 31 |
| 3. Trooper | 52 | 21 | 6. Summit | 46 | 15 |

An average yield of 51 bushels, 1 lb. per acre.

### Experimental Farm for the N. W. Territories, Indian Head, N. W. T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rennie's Improved | 61 | 45 | 4. Common | 60 | 23 |
| 2. Odessa | 61 | 35 | 5. Oderbruch | 58 | 36 |
| 3. Mensury | 60 | 40 | 6. Trooper | 57 | 1 |

An average yield of 60 bushels 6 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Oderbruch | 35 | 5 | 4. Mensury | 31 | 25 |
| 2. Odessa | 32 | 24 | 5. Royal | 30 | 27 |
| 3. Common | 31 | 42 | 6. Petschora | 30 | |

An average yield of 31 bushels 44 lbs. per acre.

The six varieties of six-rowed barley which have produced the largest average crops for the past three years on all the farms are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 51 | 5 | 4. Common | 45 | 42 |
| 2. Odessa | 47 | 10 | 5. Royal | 45 | 5 |
| 3. Trooper | 46 | 43 | 6. Oderbruch | 44 | 30 |

An average yield of 46 bushels 38 lbs. per acre.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF SPRING WHEAT.

The twelve varieties of spring wheat which have averaged the heaviest crops at the several experimental farms during the past three years are the following :—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 25 | 77 | 7. Wellman's Fife | 21 | 42 |
| 2. Monarch | 22 | 46 | 8. Pringle's Champlain | 21 | 27 |
| 3. Colorado | 22 | 32 | 9. Alpha | 21 | 20 |
| 4. White Russian | 22 | 31 | 10. Advance | 21 | 20 |
| 5. Goose | 22 | 25 | 11. Stanley | 21 | 18 |
| 6. Huron | 21 | 53 | 12. Rio Grande | 21 | 13 |

An average yield of 22 bushels 8 lbs per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Stanley | 35 | 40 | 7. White Connell | 33 | 53 |
| 2. Preston | 35 | 13 | 8. Huron | 33 | 7 |
| 3. Wellman's Fife | 35 | 13 | 9. Advance | 32 | 20 |
| 4. Red Fern | 34 | 47 | 10. Old Red River | 32 | 20 |
| 5. White Russian | 34 | 20 | 11. Rio Grande | 32 | |
| 6. Goose | 34 | | 12. Campbell's White Chaff | 30 | 27 |

An average yield of 33 bushels 37 lbs. per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Fife | 38 | 47 | 7. Advance | 34 | 53 |
| 2. Preston (2 yrs. only) | 37 | 65 | 8. Crown | 34 | 30 |
| 3. Red Fife | 37 | | 9. Monarch | 34 | 20 |
| 4. Rio Grande | 35 | 57 | 10. White Connell | 34 | 10 |
| 5. Goose | 35 | 43 | 11. Old Red River | 33 | 47 |
| 6. Pringle's Champlain | 35 | 37 | 12. White Russian | 32 | 50 |

An average yield of 35 bushels 28 lbs. per acre.

### Experimental Farm for the N.W. Territories, Indian Head, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Huron | 44 | 20 | 7. Alpha | 41 | 13 |
| 2. Beaudry | 43 | 37 | 8. Preston | 41 | 10 |
| 3. Emporium | 43 | 7 | 9. Rideau | 40 | 53 |
| 4. Red Fern | 41 | 27 | 10. Wellman's Fife | 40 | 50 |
| 5. Red Fife | 41 | 23 | 11. Crown | 40 | 43 |
| 6. Pringle's Champlain | 41 | 23 | 12. Herisson Bearded | 40 | 40 |

An average yield of 41 bushels 44 lbs. per acre.

### Experimental Farm for British Columbia, Agassiz, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Fife | 26 | 38 | 7. Alpha | 24 | 10 |
| 2. Herisson Bearded | 26 | 20 | 8. Campbell's White Chaff | 24 | |
| 3. Preston | 25 | 47 | 9. Red Fife | 23 | 28 |
| 4. White Connell | 24 | 40 | 10. Admiral | 23 | 27 |
| 5. Old Red River | 24 | 40 | 11. Red Fern | 23 | 20 |
| 6. Wellman's Fife | 24 | 20 | 12. Monarch | 23 | 13 |

An average yield of 24 bushels 30 lbs. per acre.

The twelve varieties of spring wheat which have produced the largest average crops at all the farms for the past three years are :

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 33 | 4 | 7. Red Fife | 30 | 9 |
| 2. Monarch | 31 | 2 | 8. White Connell | 30 | 6 |
| 3. Wellman's Fife | 30 | 36 | 9. Advance | 30 | |
| 4. White Fife | 30 | 25 | 10. Goose | 29 | 51 |
| 5. Rio Grande | 30 | 23 | 11. Red Fern | 29 | 49 |
| 6. Old Red River | 30 | 17 | 12. Alpha | 29 | 37 |

An average yield of 30 bushels 26 lbs. per acre.

It will be seen that the new cross-bred varieties, Preston, Advance and Alpha, which were originated at the Experimental Farms stand well to the front in these tests. Huron also, another of the cross-bred sorts, gave an average for the three years of 29 bushels 8 lbs. per acre, only 29 lbs. less than Alpha.

## PEASE, INDIAN CORN, AND FIELD ROOTS.

The records of the varieties of pease are not yet sufficiently complete to permit of an average of the crop for three years being given, a large proportion of those under test, having only been grown for one or two years at most. With Indian Corn the varieties which stand at the head of the list for weight of crop are the large-growing dent sorts, which do not mature well in the short season at Ottawa, and hence do not make the best quality of ensilage.

The different varieties of field roots have not always been consecutively tested during the past three years and therefore records for the full time are not available. In turnips the Purple Top Swedes, in mangels the varieties of Mammoth Long Red, and in carrots the Short White varieties have given the best returns.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF POTATOES.

The twelve varieties of potatoes which have averaged the heaviest crops at the several experimental farms during the past three years are the following:—

### Central Experimental Farm, Ottawa, Ont.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Late Puritan | 366 | 10 | 7. Dreer's Standard | 316 | 7 |
| 2. Irish Daisy | 359 | 4 | 8. Early Harvest | 314 | 8 |
| 3. Holborn Abundance | 357 | 8 | 9. Daisy | 305 | 34 |
| 4. American Wonder | 334 | 46 | 10. Chicago Market | 305 | 23 |
| 5. Everett | 328 | 52 | 11. I. X. L. | 301 | 35 |
| 6. Rochester Rose | 316 | 59 | 12. Empire State | 301 | 16 |

An average yield of 325 bushels 35 lbs. per acre.

### Experimental Farm for the Maritime Provinces, Nappan, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holborn Abundance | 433 | 3 | 7. Irish Daisy | 377 | 23 |
| 2. Early Puritan | 403 | 13 | 8. Dreer's Standard | 377 | 13 |
| 3. Rochester Rose | 397 | 30 | 9. Empire State | 376 | 23 |
| 4. Clarke's No. 1 | 394 | 2 | 10. Late Puritan | 376 | 7 |
| 5. Carman No. 1 | 393 | 53 | 11. Lee's Favourite | 368 | 30 |
| 6. I. X. L. | 391 | 50 | 12. Pride of the Market | 365 | 50 |

An average yield of 387 bushels 55 lbs per acre.

### Experimental Farm for Manitoba, Brandon, Man.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pearce's Extra Early | 383 | 47 | 7. Carman No. 1 | 338 | 33 |
| 2. Everett | 363 | .. | 8. Great Divide | 337 | 20 |
| 3. Early Norther | 360 | 33 | 9. Polaris | 333 | 40 |
| 4. Pride of the Market | 351 | 47 | 10. Early Puritan | 332 | 27 |
| 5. Clarke's No. 1 | 344 | 40 | 11. Lizzie's Pride | 323 | 53 |
| 6. Late Puritan | 343 | 27 | 12. Early White Prize | 312 | 57 |

An average yield of 343 bushels 50 lbs per acre.

### Experimental Farm for the N. W. Territories, Indian Head, N. W. T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Lee's Favorite | 350 | 36 | 7. State of Maine | 291 | 52 |
| 2. Northern Spy | 339 | .. | 8. Brownell's Winner | 283 | 52 |
| 3. Lizzie's Pride | 325 | 48 | 9. Empire State | 283 | 36 |
| 4. Early White Prize | 307 | 28 | 10. Early Gem | 280 | 48 |
| 5. White Beauty | 298 | 24 | 11. Clarke's No. 1 | 280 | 44 |
| 6. American Wonder | 293 | 20 | 12. Late Puritan | 267 | 36 |

An average yield of 300 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Clay Rose | 367 | 39 | 7. Troy Seeding | 277 | 35 |
| 2. Late Puritan | 319 | 15 | 8. Delaware | 267 | 55 |
| 3. Dakota Red | 308 | 5 | 9. Chicago Market | 263 | 31 |
| 4. Vanier | 304 | 35 | 10. American Wonder | 263 | 1 |
| 5. Irish Daisy | 299 | 23 | 11. Early Sunrise | 259 | 7 |
| 6. Prize Taker | 288 | 27 | 12. Moneymaker | 251 | 47 |

An average yield of 289 bushels 12 lbs per acre.

The twelve varieties of potatoes which have produced the largest average crops for the past three years on all the experimental farms are ;

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Late Puritan | 334 | 31 | 7. State of Maine | 301 | 45 |
| 2. Irish Daisy | 333 | 42 | 8. Carman, No. 1 | 300 | 46 |
| 3. Empire State | 310 | 40 | 9. Northern Spy | 297 | 21 |
| 4. Lee's Favorite | 310 | 35 | 10. Early Puritan | 296 | 48 |
| 5. Clarke's No. 1 | 309 | 48 | 11. Rochester Rose | 292 | 28 |
| 6. American Wonder | 302 | 11 | 12. Chicago Market | 292 | 20 |

An average yield of 306 bushels 55 lbs. per acre.

## CONCLUSIONS.

The results of these uniform tests of so many varieties of cereals and potatoes clearly show the wide differences which exist regarding their individual productiveness. Sown side by side, on the same day on similar soil with the same treatment and subject to precisely the same climatic conditions, the variations in the weight of crop are remarkable, and furnish the strongest proof of the importance of selecting those sorts for seed which have shown by their records that they are entitled to rank among the best.

The variations between the largest and smallest crops obtained from the sowing of different sorts under uniform conditions during the past three years, at the Central Experimental Farm, at Ottawa, are shown in the following table :—

| Crop Sown. | Season of 1895. | | | Season of 1896. | | | Season of 1897. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Largest Crop per Acre. | Smallest Crop per Acre. | Difference in Crop per Acre. | Largest Crop per Acre. | Smallest Crop per Acre. | Difference in Crop per Acre. | Largest Crop per Acre. | Smallest Crop per Acre. | Difference in Crop per Acre. |
| | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. | Bush. Lbs. |
| Oats | 74·4 | 16·6 | 57·22 | 85·10 | 45·10 | 40·0 | 57·12 | 18·3 | 39·9 |
| Barley, two-rowed | 43·16 | 20·8 | 23·8 | 51·2 | 34·38 | 16·12 | 41·7 | 14·8 | 26·47 |
| do six-rowed | 58·6 | 32·14 | 25·26 | 69·8 | 41·2 | 28·6 | 54·3 | 35·7 | 18·44 |
| Spring Wheat | 30·40 | 13·40 | 17·0 | 24·20 | 9·0 | 15·20 | 24·55 | 10·21 | 14·34 |
| Pease | 40·10 | 30·20 | 9·50 | 45·50 | 34·0 | 11·50 | 31·50 | 14·0 | 17·50 |
| Potatoes | 385·0 | 133·50 | 251·9 | 455·24 | 159·30 | 295·54 | 402·36 | 139·42 | 262·54 |

The averages obtained, as the results of the tests for three years, also furnish conclusive evidence that many of the more prolific varieties show that prolific tendency from year to year and under all the variations in climate found throughout the Dominion. Any of those varieties which are placed at the head of the list as excelling in productiveness for the past three years may be sown with the confident expectation of a good crop, provided the conditions are moderately favourable, and as the cultivation of these prolific sorts becomes more general, we may reasonably anticipate a considerable increase throughout this country in the average yield of grain in bushels per acre. In view of the large and increasing area under cereal crops in Canada, this subject is of great importance to the country. With the acreage now under cultivation every bushel of increase per acre in the cereal crops would add from two to three million dollars to the receipts of the farming community in Canada, a large proportion of which would be clear profit. Some of the desirable sorts referred to are already obtainable from seedsmen, others are being disseminated by growing them on the experimental farms and distributing the product in sample packages to farmers on application in all parts of the Dominion.

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

## BULLETIN No. 30

# TOBACCO CULTURE

APRIL, 1898

Published by direction of the Hon. Sydney A. Fisher, Minister of Agriculture

To the Honourable
The Minister of Agriculture.

Sir,—I beg to submit for your approval Bulletin No. 30 of the Experimental Farm series prepared by myself.

The rapid increase during the past few years in the area of land devoted to the growing of tobacco in Canada has resulted in a great demand for information on this subject, and many inquiries have been made by correspondents at the Central Farm for particulars relating to this industry. Under your instructions and with the view of meeting this demand, the Bulletin now submitted has been prepared, giving the results of the experience of practical men who have been engaged in tobacco growing for many years.

I trust the facts presented will be found of value to those seeking information on this subject.

I have the honour to be
Your obedient servant,
WM. SAUNDERS,
Director Experimental Farms.

Ottawa, April 5th, 1898.

# TOBACCO CULTURE.

BY

*William Saunders, LL.D., F.R.S.C., F.L.S., &c.,*

Director Experimental Farms.

The substance known as tobacco consists of the leaves of a narcotic plant, a native of South America, belonging to the order *Solanaceæ* and known to botanists as *Nicotiana Tabacum.* Its use is more general and widely spread than that of any other narcotic or stimulant; it is largely manufactured for smoking, is also prepared for chewing, and is used to a more limited extent as snuff. Specimens of this plant were first brought to Europe in 1558 by Francisco Fernandes, a physician who had been sent by Philip II. of Spain to investigate the products of Mexico. While tobacco first came to Europe through Spain, the habit of smoking was initiated and spread by English example, and Sir Walter Raleigh was one of the devotees to the use of this weed who helped to bring it into prominence. During the seventeenth century its use spread with great rapidity among all the nations notwithstanding the resolute opposition of statesmen and priests, and penal enactments of the most severe description.

There are other species of tobacco grown to a limited extent in other parts of the world, but the tobacco produced on the American continent and in Cuba, is all made from the species referred to. The tobacco plant is a coarse, rank-growing annual, which attains a height of from four to six feet, crowned with a panicle of pink flowers and having alternate leaves which are very large, often attaining a length of three feet or more and a proportionate width. Although this plant is a native of South America, it flourishes over a very wide area and adapts itself to many different climates. It is grown in most of the southern and middle States in the neighbouring republic, and its cultivation is rapidly increasing in Canada. The tobacco plant is very susceptible to variations in climate and soil; not only are the size and texture of the leaves so influenced, but the quality, strength and flavour are thus affected in a remarkable degree. During the long period this plant has been under cultivation, many different varieties have been produced, but the finer qualities of high flavour are grown chiefly in tropical countries with a comparatively dry climate. The seeds of the high-flavoured sorts, such as are grown in Cuba, when sown in the cooler climates of the eastern States or Canada produce plants of much less flavour and of a different texture. Nevertheless, many useful commercial varieties can be grown in the cooler climates of this country.

The census of Canada in 1891 shows a total product in all the provinces of 4,277,936 pounds, of which about 90 per cent was grown in the province of Quebec. Most of this crop was cultivated in small areas, rarely exceeding a few acres on any one farm. Recently the cultivation of tobacco has increased very rapidly in western Ontario, especially in the county of Essex. Walker Sons, of Walkerville, were among the pioneers in this industry, and have for some years past had the largest tobacco farm in the Dominion. In 1897 they had 130 acres under this crop. A considerable number of farmers in the neighbourhood of Leamington, Ont., have of late entered on the cultivation of this plant, growing from 5 to 20 acres each. It is estimated that about 1,000 acres of land were devoted to the growing of tobacco in that part of Essex in 1897, and that about 40 car loads of cured leaf were shipped from that district. It is believed that a much larger area will be planted during the coming season.

### SOIL AND ITS PREPARATION.

The soil most suitable for a tobacco crop is a deep rich friable loam, dry and warm, which can be easily worked up into a fine and mellow condition. While a rich sandy soil is usually preferred, the crop often does equally well on a loamy clay, provided it is of such a porous and open character as will admit of its being brought into a fine condition of tilth ; tobacco does not usually succeed well on a heavy clay. When grown on the heavier classes of soil the plants produce a thick leaf more suitable for the manufacture of chewing tobacco, and when grown on lighter sandy soils a thin or light leaf more suitable for the making of cigars. The tobacco plant grows very rapidly and is a gross feeder and needs an abundant supply of plant food, hence, in the preparation of the soil for this crop barn-yard manure is used very liberally. About thirty two horse loads, or more, per acre are applied during the winter or early in the spring and ploughed under. Subsequently the land is harrowed—usually with a disc-harrow—from time to time until the soil is thoroughly and finely pulverized to a depth of about three inches. Wood ashes may also be freely used with much benefit to this crop.

### SOWING THE SEED.

Tobacco seed is sometimes sown in hot-beds, sometimes in cold frames and occasionally in open ground. The first method has been practised at the Central Experimental Farm at Ottawa and is the plan usually followed in the province of Quebec, but in western Ontario, where the season is longer, although hot-beds are frequently used, the sowing of the seed in cold frames and open beds is not uncommon.

In preparing a hot-bed select a southern or south-eastern exposure sheltered on the north, and dig out a space 5 feet by 12, or any required length, to the depth of 18 inches. Place 3 or 4 inches of straw in the bottom and cover with fresh manure from the horse stable to the depth of 8 or 10 inches, treading it down well.

Cover with good rich loamy soil to a depth of 4 or 5 inches, and pack it firm. Allow this to stand for a few days to heat up and then rake the bed smooth, when it will be ready to receive the seed. Where a hot-bed is used, the seed may be sown in rows from 4 to 6 inches apart, or broadcast, having previously been mixed with ashes or corn-meal so as to ensure more evenness in sowing. If sown broadcast the surface should afterwards be pressed firmly by placing a board about one foot wide and nearly the length of the bed, on the surface of the newly-sown ground, and walking over it, then move the board so as to press another foot, and so on, until the whole bed is evenly pressed. Then cover with frames either glazed or covered with cotton to protect from cold and frost and sprinkle the surface often enough with water or weak liquid manure to keep it moist. Germination takes place in about ten days, and in from twenty to thirty days after the plants appear, they should be large enough to transplant

Where the seed is sown in cold frames or open beds, a sheltered position is desirable,with a southern exposure. Upon the plot selected, brush is usually burnt until the soil is made hot enough to kill the seeds of grass and weeds near the surface. When the soil has thus been baked to the depth of about half an inch and the bed has cooled, the surface is stirred with hoe or spade to the depth of 2 or 3 inches. Well-rotted manure is then spread over the ground and raked and worked until it has become thoroughly mixed, and the whole made mellow and fine. Mix carefully one tablespoonful of seed with about a quart of ashes and sow broadcast. This quantity is sufficient for a bed ten feet square, and should furnish plants enough for an acre of land. Brush or rake the seed in very lightly and use a light roller to make the surface compact, smooth and even, or press the surface smooth with a board in the manner recommended for the sowing in hot-beds. Use cotton covered frames or cover with light brush thick enough to afford some shade to the young plants and to protect them from drying winds, and water from time to time as needed to keep the ground moist. Keep the plants free from weeds and thin them out where necessary to avoid crowding. Sometimes the seed is sprouted before sowing. This may be done by mixing it with some fine mould and placing it near a stove or in some other warm place and keeping it moist for four or five days. Sow it as soon as it can be seen to have sprouted. By adopting this plan some time may be saved, but it is not generally recommended. The time of sowing will vary in different localities, ranging in Canada from the 1st to the 15th of April, and the young plants will be ready to put out from the 25th of May to the 10th of June. The seed bed should be large enough to permit of a sufficient number of plants of the same size being taken from it to complete the planting of the desired area at one operation, so that the subsequent growth may be even and regular. There should also be a surplus left sufficient to fill the vacancies caused by failure.

## PLANTING.

The plants are usually put out in rows about 4 feet apart and from 2½ to 3½ feet apart in the rows. Where practicable, the rows

should run north and south so that each plant may get the largest amount of sunshine. The places for the plants in the rows are usually indicated by running over the ground with a corn marker. Some prefer to ridge the ground before planting, and claim that subsequent cultivation can be carried on with less injury to the plants where this method is practised. If the ground be flat or heavy this plan is preferred, but on lighter soils with good drainage the plants may be successfully grown either with or without ridging.

When the plants in the seed bed are 4 to 5 inches high and the largest leaves from 2 to 2½ inches wide they are ready for the field. Before any are lifted the bed should be thoroughly sprinkled with water so that the earth may adhere to the roots. A cloudy day after a shower of rain is preferred for transplanting, but if the plants are carefully removed with a ball of earth attached to the roots of each they may be set out with fair success, provided the ground is reasonably moist, without waiting for such specially favourable conditions. Small plants should not be used, it is better to wait a few days until they are of the proper size. When planting, a basket of plants is carried by a boy up between the rows when one is dropped at each side where indicated by the marker; the men follow and put them in the ground, using a planting peg or the finger for this purpose, pressing the earth carefully about the roots. Where the plantation is very large, a planting machine is sometimes used. Messrs. Walker Sons use the Bemis' planter by which with one pair of horses, driver and two men to tend the machine, about twenty thousand plants may be set per day.

Some experiments have been tried at the Central Experimental Farm as to the effects of twice transplanting. The plants were pricked out from the hot-bed to cold frames, where they were set in rows 8 inches apart, and about 3 inches apart in the rows, and after they had grown strong and stocky they were transplanted to the field. It was observed that when treated in this way the plants grew more rapidly and there were fewer failures in planting than when they were transplanted directly from the hot-bed to the field. The yield of leaf was also larger. When transplanting from the beds the thinning should be so carried out as to give the remaining plants more room and thus permit of a spreading stocky growth.

## CULTIVATION.

After planting, the ground should be stirred with a one-horse cultivator about once in ten or twelve days, so as to keep the land thoroughly clean from weeds, and in a porous and mellow condition. Frequent cultivation will also induce more favourable conditions of moisture. This should be continued as long as the cultivator can be passed through the rows without injuring the plants. After this, as the roots of the plants will then almost fill the space between the rows, the ground should be kept clean by shallow hoeing.

## PRIMING AND TOPPING.

By the word "priming" is meant the removal of the lower or primary leaves which come out too near the ground, and often touch the surface and become torn and sandy. It is an advantage to do this work early, so that the plants may not unnecessarily lose strength by their growth. The distance from the ground this priming should be done depends somewhat on the variety, but the bottom of the stalk is usually stripped to a height of from 4 to 6 inches from the ground.

Topping is the removal of the flower stalk with one or more of the upper and smaller leaves. This is done to throw the strength of the plant which would otherwise go to the production of seed, into the more perfect development of the leaves. The plant is ready to top when the "button," as the blossom is called, has grown long enough to be taken hold of without injuring the upper leaves of the plant. As the plants do not all blossom at the same time, it is usual to let those stalks which bloom first run a little beyond the usual time of topping, so that all may be topped at the one operation. The tops when broken off should be thrown between the rows and allowed to decay. The number of leaves left on the stem at the time of topping varies from ten to sixteen or eighteen, depending on the variety grown ; if topped too high the upper leaves are apt to be too small to be of much value. As the leaves of the tobacco plant are arranged on the stem in eight perpendicular ranks, the ninth leaf stands directly over the first. This fact will assist the operator in determining the number of leaves on a stalk without counting them.

## SUCKERING.

After topping, "suckers" soon begin to grow, shooting out from the stalk on the upper side of each leaf at the base, those at the top starting first. As soon as they are large enough to be pulled they should be promptly removed, otherwise much of the strength of the plant will be lost and the maturing of the crop delayed. Should they start a second or third time, they should be again removed.

## SAVING OF SEED.

To obtain seed for sowing the following year, a few of the earliest, most thrifty and large-leaved stalks should be left without topping. These will bloom and seed freely, and when the crop is cut these stalks should be allowed to stand. As soon as the seed pods turn to a blackish colour the seed will be nearly matured ; then cut off the heads and hang them up in a dry place to cure. Later in the season strip the seed pods from the stalks, rub them in the hand and clean the seed by sifting through a fine sieve. Tobacco seed is said to retain its germinating power for several years.

## INSECT ENEMIES.

Cutworms are sometimes very active in destroying the newly set plants. Where these are troublesome they may be reduced in

number by placing at many different points in the field small bunches of poisoned weeds, grass or clover. These bunches are tied and rendered poisonous by dipping them in a mixture of Paris green and water in the proportion of two ounces of the poison to a pailful of water. The cutworms take shelter under the bundles of weeds and eat of the poisoned material and die. In hot weather these bundles should be put out after sundown and a shingle may be laid on each to keep it fresh. Cutworms are the caterpillars of dull-coloured active moths or "millers," which fly at night, mostly during the month of July. The caterpillars lie hidden during the day and come out to feed at dusk. They are smooth and naked, and are usually of some dull shade of greenish grey, or brown, with dusky markings. When these caterpillars are fully grown, which is usually in the latter part of June, they enter the ground and change to chrysalids, from which the moths emerge later in the season. These deposit their eggs on grass or other plants or weeds ; the young larvæ hatch in about a fortnight and feed usually unobserved amid the abundant growth of summer, and when they reach a length of one-half to three-quarters of an inch they bury themselves in the ground in autumn, where they remain until the following spring. On emerging from their long period of torpor they become very active and feed greedily on almost any green plant which comes in their way.

Cutworms usually attack the plants about the base, and having eaten the stem through leave the greater part of the young plant to wilt and perish. Where a plant suddenly withers and dies, the author of the mischief can generally be found within a few inches of the plant, buried just below the surface of the ground. In such cases they should be searched for and destroyed. Where cutworms are plentiful it is necessary to look over the plants every day or two, and to promptly reset any which may have been killed.

After the cutworms have disappeared the caterpillar of a large sphinx moth, *Sphinx quinquemaculatus*, becomes a most troublesome foe to the tobacco grower. This insect spends the winter in the chrysalis state buried in the ground. Early in June the chrysalis wriggles its way up to the surface, when the moth escapes. It flies at dusk and in its flight much resembles a humming-bird, and soon begins to deposit eggs. These are laid singly on the under side of the leaf, where they hatch in the course of a few days when the young larva or "worm" begins to feed on the leaf, making small holes here and there in it. About the time when the leaves are as large as a man's hand these caterpillars appear. The plantation should then be gone over carefully, looking at every plant. A sharp eye will detect the small holes they make in the leaf very promptly, and on turning it up a small green caterpillar will be seen on the under side with a projecting horn on the hinder end of its body. These should be at once destroyed, which may be done by crushing them between the finger and thumb. As the eggs of these caterpillars continue to be laid during a considerable part of the season, constant watchfulness and frequent inspection is needed to prevent injury to the crop. Where the fields are neglected these caterpillars grow rapidly and

eat voraciously, and a single specimen will soon destroy the greater part of the leaves of the plant on which it has been placed and on several others near by. When full grown this larva is 3 inches long, or more, and about the thickness of the fore-finger, green, with paler stripes along the sides of the body. When disturbed it raises its head in a threatening manner and looks quite ferocious, but is incapable of inflicting any injury.

### HARVESTING.

When the leaves approach maturity they gradually lose their deep green colour and assume a yellowish hue, which, in some varieties, is mottled with deeper markings of the same colour. The veins of the leaves become swollen and the substance of the leaf feels thick and gummy. At this stage the tip of the leaf becomes somewhat brittle and the midrib will usually break with a clean fracture if the tip is sharply doubled back ; the leaves are then ready for harvesting. When the leaf is sufficiently matured, the sooner it is cut the better, as it is liable to injury from frost or other unfavourable weather. The usual method is to cut the plant down nearly to the ground and suspend the stalk with its leaves attached in a suitable drying-house where, when dried, the leaves are stripped and packed. The other method which is sometimes followed by those who cultivate tobacco on a small scale, or where labour is plentiful and cheap, is to strip the leaves from the plants in the field, gathering them as they mature and stringing them on twine or wires attached to laths or strips in such a manner as to allow each strip with its load of leaves to be handled separately. These are then placed in the drying-house to cure. By this process a better quality of leaf is obtained but at a larger cost for labour.

Some growers split the upright stem of the plant before cutting, with a sharp knife down the middle to within 4 or 5 inches of the base, then withdraw the knife and cut the stalk off close to the ground. This plan is said to be convenient for hanging, as the stalks can be placed astride the strips on which they are suspended and the leaves on stalks thus treated dry more rapidly ; they are, however, more apt to slip off the sticks when moving them.

Another method is to pierce through the stalks with a V-shaped spear made of iron or steel, with a socket large enough to admit the end of a stick on which the tobacco is to be hung. The stick is set upright on the ground, fitted with the spear at the end, when the tobacco is lifted, one stalk at a time, and thrust on the spear, which passes through the stalk, about six inches from the base. The sticks are usually made 4½ feet long, and afford space enough to suspend eight plants. When one stick is filled, the spear is taken off and attached to another, and this process is continued until the plants are all hung. Other growers prefer to suspend the plants by tying them to suitable sticks with twine.

Cutting should begin as soon as the dew is off the plants in the morning. Cut with a hatchet or suitable knife, grasp the stalk with the left hand and bend it well to the left, so as

to expose the lower part of the stalk, and sever with the knife near the surface of the ground, letting the stalk drop over without doubling the leaves under. Lay the plants on the ground to wilt for an hour or two, or until the leaves lose their brittleness and can be handled without breaking. Then load the tobacco on a wagon, keeping the butts out on both sides in loading, and draw to the drying-house. No more plants should be cut than can be taken in and hung up the same day. Never cut tobacco on a rainy day, as the leaves are then sure to get sandy, which will lessen their value, and do not allow the plants to lie long on the wagon or in a pile, as they soon sweat and heat, which quickly injures them.

### DRYING.

A house 30 by 24 feet so arranged as to hang the tobacco in four tiers is said to be large enough to give drying accommodation to an acre of tobacco. Most growers prefer to build their drying-houses tight, so that they may be closed up in unfavourable weather. Such buildings are supplied at the base with a number of doors, affording openings large enough to admit air freely, and ventilators are provided above. Drying-houses are most commonly built from 16 to 20 feet wide, 16 feet high and 40 to 50 feet long, or longer if required. Occasionally buildings are met with which have their sides covered with boards so placed as to leave an inch or more of space between each to provide for free access of air. This, however, does not afford sufficient protection in case of unfavourable weather. Whatever method may be used for hanging the stalks, they are placed on the sticks about 5 inches apart, leaving eight or nine stalks on a stick, and the sticks are so arranged as to leave a space of 8 or 9 inches between them.

When the plants are sufficiently dried, which is known by the stems becoming of a brown colour and breaking when bent, the tobacco is ready for stripping. Damp weather is chosen for this operation, when the damp air is freely admitted and the leaves absorb moisture so that they can be handled without breaking. The operator pulls the leaves from the stalks one by one, until he gets what is technically called a "hand," which consists of from twelve to sixteen leaves, when these are fastened together by a good leaf folded to two or three inches in width, and wound around the base and secured by tucking the end under. During the stripping the leaves are separated into two grades according to size and soundness—all the torn and injured leaves, as well as the small and less matured specimens, forming the second grade.

### BULKING.

After the tobacco is stripped it is packed down each day where it will be secure from drying winds or wet. The "hands" are placed with butts out and the leaves overlapping at the tips for about one-third of their length, laying one row of butts one way, then another on the opposite, keeping them straight and

even to prevent the air from drying the material. The "hands" are pressed together by kneeling on them while packing, and when the piles have reached a convenient height, say 3 to 4 feet, they are weighted with heavy planks on top so as to press the material down as compact as possible. The pile is then covered with some fabric or material such as blankets or sacking to prevent the drying of the exposed parts, and in this condition it is allowed to remain about a month during which time the curing or "sweating" process goes on by which when properly attended to the leaves acquire a uniform colour. The bulking is followed by an increase of temperature in the pile, which should be watched, and when a thermometer placed in the centre of the heap indicates a temperature of 100 to 110 Fahr., or when the heat is uncomfortable to the hand when introduced, the "bulk" should be opened and rearranged so that the outer and upper tiers may be brought to the centre. In this way the heat is lessened and the curing process proceeds evenly and uniformly throughout the pile. When the tobacco is thoroughly cured the "bulk" is opened and the material arranged more loosely and gradually cooled when the tobacco will be ready for market. When disposed of, it is usually packed in bales of about 100 lbs. each, firmly pressed together and enclosed in sacking.

## VARIETIES.

Among the earliest and best yielding varieties tested at the Experimental Farm are: White Burley, Connecticut Seed Leaf, Pennsylvania Seed Leaf, Pryor Yellow, Climax, Yellow Mammoth, Oronoko Yellow, Safrano, Brazilian and Canadian. In 1896 the White Burley grown at the Experimental Farm was matured and partly harvested, when a sharp frost occurred in September, which greatly injured the later sorts. The White Burley is much grown in the Province of Quebec, and is also the variety most extensively cultivated in western Ontario. The Connecticut Seed Leaf stands probably next in public favour, and is well spoken of generally. Messrs. Walker Sons have found the White Burley and Connecticut Seed Leaf the most profitable varieties to grow, and think that a fair average of the yield of these varieties, taking one season with another, would be about 1,800 lbs. of cured tobacco per acre. Dr. G. LaRoque, late M.P. for Chambly County, Quebec, in his excellent little book on "Culture et Préparation du Tabac" gives the crop of the different varieties grown in Quebec as ranging from 900 to 1,500 lbs. per acre, while Mr. M. G. Bruner of Olinda, Ontario, estimates the crop about Leamington at from 1,000 to 1,100 lbs. per acre. Where the same varieties are grown the yield in every case will depend much on the quality of the land and the quantity of manure which has been used. In the small experimental plots at the Central Experimental Farm, the weight of crop has been estimated in different seasons from about 1,500 to 2,500 lbs. or more per acre.

## TOBACCO AN EXHAUSTING CROP.

From the reports which have been published of chemical analyses of the leaves and stalks of the tobacco plant, it is evident that this crop draws heavily on the potash in the soil. It is also a considerable consumer of nitrogen and of lime. On such land as is frequently used for this crop, the ploughing under of clover to enrich the soil, large applications of barn-yard manure, liberal dressings of wood ashes or of salts of potash, and an occasional application of lime, will all be found beneficial. As the stalks take from the soil about the same proportion of the fertilizing constituents as the leaves, the exhausting effect of this crop on the land may be lessened by allowing the stalks to remain on the ground to decay and then ploughing them under.

In the preparation of this bulletin the writer has been aided by valued information from Walker Sons, of Walkerville, Ont., from John McNutt, Ruthven, Ont., and other practical tobacco growers both in Quebec and Ontario. Free use has also been made of the information gained by the comparative test of varieties carried on for several years by the Horticulturist at the Central Experimental Farm.

DEPARTMENT OF AGRICULTURE

CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

# BARN-YARD MANURE

ITS

NATURE, FUNCTIONS, COMPOSITION, FERMENTATION PRESERVATION AND APPLICATION

BY

FRANK T. SHUTT, M.A.

*Chemist, Dominion Experimental Farms*

BULLETIN No. 31

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To the Honourable
The Minister of Agriculture.

SIR,—I herewith submit for your approval Bulletin No. 31 of the Experimental Farm series, on Barn-yard Manure, which has been prepared under my direction by the Chemist of the Experimental Farms, Mr. Frank T. Shutt.

The proper care of barn-yard manure and the most economical methods of using it, are subjects of great importance to farmers. Too often there is more or less carelessness in connection with the handling of this valuable fertilizer, which invariably results in considerable loss.

The facts presented in this bulletin regarding the nature, composition, preservation and application of barn-yard manure offer convincing proof of the necessity of close attention to this matter, and it is hoped that, by thus bringing prominently forward the errors in practice, so common among some Canadian farmers in regard to the care and storing of this useful fertilizer such reformation may be brought about as will result in much benefit.

I have the honour to be,
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, 1st December, 1898.

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# BARN-YARD MANURE

## ITS NATURE, FUNCTIONS, COMPOSITION, FERMENTATION, PRESERVATION AND APPLICATION

BY

FRANK T. SHUTT, M.A., F.I.C., F.C.S.,
*Chemist, Dominion Experimental Farms.*

There is certainly no subject in connection with farming of greater interest and importance than that of barn-yard manure. In this necessary and natural bye-product of every farm, the agriculturist should recognize his home supply of plant food, the chief means by which he may maintain and increase the fertility of his soils. That this truth is not fully realized is evident from the wasteful neglect so frequently to be seen in the care of manure upon our farms throughout the country. Through carelessness or ignorance, or both, the most valuable part of the manure—because the richest in available plant food—is allowed to drain away, finding its way finally to the creek or river, or, to the danger of the health of the household or stock, into the well. We believe, therefore, that the dissemination of knowledge regarding the composition and nature of farm manures and the care they should receive will be timely and lead to greater economy in the management of those stores of fertility annually produced upon the farms of Canada.

### SOIL FERTILITY.

*The Factors Necessary for Plant Growth.*—Since the object in applying barn-yard manure—or, indeed, any manure—is to increase a soil's fertility, it is important to have a clear understanding at the outset as to what constitutes this quality or condition. A soil's fertility, or crop-producing power, is dependent upon various factors, chief among

which undoubtedly is the presence of an abundance of assimilable—that is, more or less immediately soluble—plant food. There are, however, other factors or conditions that tend toward soil-productiveness, and since barn-yard manure, besides supplying the elements for the nourishment of crops, affects directly or indirectly these conditions, it will be well to consider them, if only briefly.

*Light and Air.*—In the absence of light and air, plants cannot thrive, for while the latter supplies the greater portion of their nourishment, the former serves to convert such within the plant into vegetable substances. Since, however, light and air are abundantly provided by nature, it will not be necessary here to dwell at any length upon their agricultural functions.

It is, however, important to point out that roots, as well as leaves, require air. Water-logged, badly drained soils and heavy, plastic clays exclude the air, and consequently have a low degree of fertility. Barn-yard manure and all organic manures do signal service for such soils by rendering them more porous and permeable to air.

Respecting the value of light, it will only be necessary to state that the full effect of manure is not obtained when crops are too thickly sown. An excellent illustration of this is afforded by the Indian corn crop. Carefully conducted experiments have shown that the amount of real cattle food furnished by, say, an acre of corn sown broadcast is very much less than that obtained from a similar area planted in rows or hills.

*Warmth and Moisture.*—With these also the control of the farmer is only indirect. It is, nevertheless, well to remember that judicious culture may vastly increase and also regulate a soil's warmth (so necessary, especially in seed germination and the younger stages of growth), as well as affect beneficially its capacity for holding moisture. Between 80 per cent and 90 per cent of growing plants is water. All of this, and much more which is transpired through the leaves during the life of the plant, is drawn by the roots from the soil. The presence of organic matter, as furnished, for instance, by barn-yard manure, is instrumental in controlling a right degree of soil moisture during seasons of drought, and by its fermentation raises the soil's temperature.

*Good Tilth.*—For want of another term to denote that suitable and favourable physical or mechanical condition of soil which is the result of judicious culture and the application of manures, the writer has been obliged to use the expression "good tilth." This, we acknowledge, is a somewhat new application of the word tilth, but it is one

which we believe, though comprehensive, will be well understood. A heavy, plastic clay that bakes into hard masses, a light and too porous sand that neither holds moisture nor affords a firm root-hold to plants, a peaty or swamp soil practically destitute of clay and sand—none of these can be said to be in good tilth. A soil, however, composed of these elements in right proportions and intimately mixed and so cultivated that air is present between the soil particles, that possesses a good absorptive capacity for moisture, freedom for root extension and yet withal a certain firmness, such a soil may be said to be in good tilth. Draining, ploughing, harrowing, cultivating and the like have for their object the improvement of the mechanical condition of the soil, and indirectly the liberation of soil plant food; hence these operations are essential for soil betterment. It is nevertheless true, however, that the presence of humus from the decay of farm manures or other organic matter, is a necessary factor towards the same end. It is evident, therefore, that the structure or texture of a soil must be studied, as well as its supply of plant food; in other words, the physical and chemical condition of a soil must both receive attention, for both, viewed from the standpoint of fertility, are intimately, we may say, inseparably connected.

*The Composition of Soils.*—All fertile soils contain two classes of constituents, known as organic and inorganic or mineral. The organic portion of a soil is that which has been formed by the decay of plants; the inorganic, that which has been the result of the disintegration and partial decomposition of the original rock masses.

*Organic Constituents.*—As the decay of vegetable matter proceeds in the soil there results a black or brownish-black substance destitute of organic structure, which is known as humus.

Humus has been called "the soil's storehouse of nitrogen." This element (nitrogen) is one of the essential forms of plant food, and when bought in commercial fertilizers is the most costly. It should here be pointed out that the nitrogen in humus (which may be termed organic nitrogen) is not directly available to crops, but is rendered so by nitrification, a process resulting from the activity of certain microscopic plants or microbes within the soil which live upon and decompose the organic matter there present. Recent research has shown that soil fertility is largely dependent upon the presence of these microbes. Warmth, moisture, and air are primarily necessary for the development and reproduction of these micro-organisms; in other words, for the nitrification of the humus. Certain bases also, such as lime and potash, must be present in the soil, so that as a result of this

process *nitrates* may be formed—inorganic compounds which crops absorb by their rootlets for their supply of nitrogen. Barn-yard manure introduces into the soil those microscopic organisms in large quantities, a quality not possessed by chemical fertilizers.

Analysis has shown that the amounts of humus and nitrogen are, generally speaking, closely related, and that the former is a measure of the latter. A soil poor in humus is likely to be deficient in nitrogen. Fertile soils in temperate zones are always characterized by richness in humus and nitrogen. The colour of a soil frequently indicates its quality in this respect, dark brown and black soils possessing large percentages of these constituents. There are, however, exceptions to this, as the presence of much red oxide of iron, (as in some sandy soils) may mask the colour of the humus.

The sources of humus in cultivated soils are practically three, the decaying roots of crops, barn-yard manure, and "green crops," such as clover, turned under. This last has of recent years become recognized as an economical method for enrichment of the soil in humus and nitrogen.

In addition to nitrogen, humus contains certain small quantities of inorganic plant food, such as lime, potash and phosphoric acid. These are liberated by the decay of the humus in forms most useful to plant nutrition.

The mechanical benefits to be derived from humus, we have already referred to. It is only necessary here to emphasize the value of barn-yard manure—a material rich in nitrogenous organic matter—in this connection. In comparing farm manures with commercial fertilizers, this is a point frequently overlooked.

*Inorganic Constituents.*—In furnishing or replacing in the soil mineral or inorganic plant food, practice has shown that as a rule it suffices to supply three elements—potash, phosphoric acid and lime. Others are used by crops, but the amounts so used are so small that the soil's store of them is not seriously diminished by cultivation. Potash, phosphoric acid and nitrogen are known as the essential elements of plant food, from the fact that it is continually necessary to return them in available forms if soil fertility is to be maintained and increased. For many soils, lime must be added to this list.

The mineral constituents come originally, as already stated, from the rocks that form the base of the soil. They are being constantly removed by cropping. Thus, a four years' rotation of wheat, barley,

potatoes and hay will remove per acre approximately, in addition to nitrogen, 222 pounds of potash and 80 pounds of phosphoric acid, and a rotation of wheat, oats, mangels and hay, 342 pounds of potash and 83 pounds of phosphoric acid.

The potash, phosphoric acid and lime in barn-yard manure have once been present in the soil. Absorbed by plants, and the product used for the nourishment of animals, these elements are to be found in the excreta, minus small abstractions for the formation of bone, &c. It is obvious, therefore, that they can be replaced in the soil by applying the solid and liquid manure of the farm.

Without losing sight of the many secondary advantages to be derived from barn-yard manure—advantages, as we have seen, both chemical and mechanical in their nature—the value of this source of plant food must be recognized primarily as depending on the amounts of nitrogen, phosphoric acid and potash it contains and supplies, and it is from this standpoint principally that we shall now consider it. It may, however, be well to repeat in concise form that the various useful and important functions of barn-yard manure within the soil are (1) in supplying plant food, (2) in liberating inert or unavailable plant food, (3) in the improvement of tilth and thereby regulating the soil's absorptive capacity for moisture and warmth, and (4) in furnishing food for and fostering the development of certain useful microscopic plants, known as microbes.

## Barn-yard Manure: its Nature and Composition.

The word manure is derived from the French *manœuvrer*, to work with the hand. The significance is worth noting, since it points to the benefit—chiefly in the liberation of assimilable plant food—to be derived from tillage operations generally. Cultivation, any mechanical process that increase soil fertility, would by this derivation be called manuring. This old meaning, however, has passed away, and the use of the term manure is now restricted to materials containing one or more of the essential elements, nitrogen, phosphoric acid and potash, and which are employed to furnish crops with the food they require. In quite recent times, the term "fertilizer" has been used, more or less exclusively, for chemical and mineral substances supplying plant food, such as nitrate of soda, superphosphate, kainit, &c., and the word "manure" has become practically synonymous with "Barn-yard Manure."

By barn-yard manure we understand a mixture of the solid and liquid excreta of farm animals together with the straw or other litter used in their bedding.

The agricultural value of any sample of manure will depend primarily and chiefly upon the amounts of nitrogen, phosphoric acid and potash it contains, and, secondarily, upon the solubility or availability of these fertilizing constituents and the amount of organic matter (which will form humus in the soil) it possesses.

The solid excreta (dung) consists of the undigested portion of the food; the liquid excreta (urine) contains products resulting from the digestion of the food, in fact, that portion of the digested food that has done its work in the animal, but is not retained in the production of flesh, milk, wool, &c.

Urine, weight for weight, has a greater manurial value than solid excrement, not only by reason of its larger percentages of plant food constituents (more especially nitrogen and potash), but also from the fact that these constituents are soluble, that is, are practically immediately available for the nutrition of crops. The nitrogen of urine (present as urea) is quickly converted into a valuable form of plant food, whereas the nitrogen of the undigested food in the solid excrement is but slowly changed into such compounds.

In speaking of the relative values of solid and liquid excrement, it may be pointed out that "one-half, and frequently more" of the total nitrogen excreted by the animal is to be found in the urine. More than 90 per cent of the total potash is also present in the liquid excrement. The phosphoric acid and lime, save in the case of the horse, on the other hand, are practically all in the dung. The composition and digestibility of the food will have much to do with the relative proportion of the fertilizing constituents in solid and liquid excreta. On this point Warington speaks as follows:—"If the food is nitrogenous, and easily digested, the nitrogen in the urine will greatly preponderate; if, on the other hand, the food is one imperfectly digested, the nitrogen in the solid excrement may form the larger quantity. When poor hay is given to horses, the nitrogen in the solid excrement will somewhat exceed that contained in the urine. On the other hand, corn and cake yield a large excess of nitrogen in the urine."

The composition of barn-yard manure, in other words, its value as a direct supplier of plant nutrition, will, therefore, depend not only upon the relative proportions of solid and liquid excreta and litter making up the whole, but also upon certain factors affecting the two former, which we may now consider.

## Solid and Liquid Excreta.

The composition of the excreta will depend upon (1) the kind, (2) the food, (3) the age, and (4) the condition and function of the animal producing it.

*Kind.*—Considering the farm stock, horses, sows, pigs and sheep, we find that, other things being equal, the analysis of the fresh solid excreta of these animals presents us with the following data, which, however, we must point out, should only be regarded as approximate. The food of the animal, as we shall presently see, has the greatest effect upon the composition of the resulting manure.

PERCENTAGES OF NITROGEN, PHOSPHORIC ACID AND POTASH IN THE FRESH SOLID EXCREMENT (DUNG).

| —— | Water. | Nitrogen. | Phosphoric Acid. | Alkalies, Potash and Soda. |
|---|---|---|---|---|
| Horses | 76 | ·5 | ·35 | ·3 |
| Cows | 84 | ·3 | ·25 | ·1 |
| Pigs | 80 | ·6 | ·45 | ·5 |
| Sheep | 58 | ·75 | ·60 | ·3 |

This places the dungs of the animals in the following order of value: Sheep, pigs, horses, cows.

Similar data respecting urine may be tabulated as follows:—

PERCENTAGES OF NITROGEN, PHOSPHORIC ACID AND POTASH IN THE FLUID EXCREMENT (URINE).

| —— | Water. | Nitrogen. | Phosphoric Acid. | Alkalies, Potash and Soda. |
|---|---|---|---|---|
| Horses | 89·0 | 1·2 | ........ | 1·5 |
| Cows | 92·0 | ·8 | ........ | 1·4 |
| Pigs | 97·5 | ·3 | ·12 | ·2 |
| Sheep | 86·5 | 1·4 | ·05 | 2·0 |

The urine of the sheep is seen to be the most valuable, containing the largest amount of nitrogen and potash. That of the horse ranks next, with cow's and pig's following in the order named.

It will be noticed that the urine of animals is much richer in nitrogen and potash than the solid excrements, but it is practically destitute of phosphoric acid.

COMPOSITION OF THE MIXED EXCREMENTS (BOUSSINGAULT).

| | Nitrogen. | | Phosphoric Acid. | | Potash. | |
|---|---|---|---|---|---|---|
| | Per cent. | Per ton. | Per cent. | Per ton. | Per cent. | Per ton. |
| | | Lbs. | | Lbs. | | Lbs. |
| Horse, mixed excrements... | ·705 | 14·1 | ·25 | 5·0 | ·134 | 2·68 |
| Cow " " ... | ·547 | 10·9 | ·08 | 1·6 | ·304 | 6·08 |
| Sheep " " ... | ·71 | 14·2 | ·25 | 5·0 | ·87 | 17·4 |
| Pig " " ... | ·37 | 7·4 | ·28 | 5·6 | ...... | ........ |

A study of this table will show horse manure and sheep manure to be very similar in the amounts of nitrogen and phosphoric acid they contain, being richer in these elements than those from cows and pigs, with the exception of phosphoric acid in the case of the latter. It is also worthy of note that cow and horse manure supplement one another, the former being rich in potash, the latter in nitrogen and phosphoric acid. Together they form a complete manure, furnishing in good proportions the three essential constituents of plant food.

The following table, compiled by Heiden, a celebrated German authority, gives the averages of a very large number of analyses.

COMPOSITION OF MIXED EXCREMENTS (HEIDEN).

| | Nitrogen. | | Phosphoric Acid. | | Potash. | |
|---|---|---|---|---|---|---|
| | Per cent. | Per ton. | Per cent. | Per ton. | Per cent. | Per ton. |
| | | Lbs. | | Lbs. | | Lbs. |
| Horse, mixed excrements... | ·6 | 12·0 | ·3 | 6·0 | ·5 | 10·0 |
| Cow " " ... | ·34 to ·44 | 6·8 to 8·8 | ·1 | 2·0 | ·8 | 16·0 |
| Sheep " " ... | ·9 | 18·0 | ·5 | 10·0 | 1·0 | 20·0 |
| Pig " " ... | ·5 to ·6 | 10·0-12·0 | ·1 | 2·0 | ·5 | 10·0 |

From these averages it is also seen that the composition of farmyard manure is materially affected by the proportion of cow to horse manure it contains.

## FACTORS INFLUENCING THE COMPOSITION OF THE EXCRETA.

*Food.*—This is by far the most important factor in determining the fertilizing value of both the dung and the urine. The quality of the manure is *chiefly* dependent upon the quality of the food consumed. The richer the food in albuminoids or flesh-formers, the

richer will the manure be in nitrogen. The same statement will hold good regarding phosphoric acid and potash. Again, the digestibility of the diet has much to do with the quality of both the solid and liquid excrement. In this connection, we would refer to the quotation from Warington's "Chemistry of the Farm," already given on page 12.

As showing this effect of diet upon quality and quantity of manure produced, we may insert the subjoined table containing results obtained at Rothamsted by Lawes and Gilbert. The figures are from an experiment with cows fed with mangels (a poor food), and lucerne or alfalfa hay (a feeding stuff rich in fertilizing elements):

| Fresh Manure per day. | Mangels. | | Lucerne Hay. | |
|---|---|---|---|---|
| | Solid Excrement, 42 lbs. | Urine, 88 lbs. | Solid Excrement, 48 lbs. | Urine, 14 lbs. |
| | Per cent. | Per cent. | Per cent. | Per cent. |
| Water | 83·0 | 95·94 | 79·70 | 88·23 |
| Nitrogen | ·33 | ·124 | ·34 | 1·54 |
| Phosphoric acid | ·24 | ·011 | ·16 | ·006 |
| Potash | ·14 | ·597 | ·23 | 1·690 |

The above data afford a striking illustration of the great influence of food. We may safely infer that manure from cattle wintered upon straw will not only be scanty as regards quantity, but also very poor in plant food. A liberal diet of nourishing food not only gives the best results as regards the stock, but also produces the richest manure.

As the quality and quantity of the solid food affect the amount and composition of the excrements, so does the amount of water drunk. The more water that the animal takes, the poorer or more dilute will be the urine, but the inferior quality will be "largely compensated for by the increased quantity voided."

*Age.*—Young and growing animals absorb a much larger percentage of the fertilizing constituents of their food than do those that are mature or full grown. Stated approximately, we may say that from 50 to 75 per cent of the nitrogen, phosphoric acid and potash of the food of the former will be found in the manure, from 90 to 95 per cent in that of the latter.

*Condition or Function of the Animal.*—From the foregoing paragraph it might be inferred that according to the wants or requirements of the animal, so is the quality of the resulting manure. Such is found

to be the case. The production of milk, flesh and wool makes a heavy demand upon the food, so that the manure of animals manufacturing these is poorer than similar animals that are not performing these functions. Mature animals at rest return practically all the fertilizing constituents of their food in their excrements. Cows in milk utilize about 25 per cent of the plant food elements in their diet, and their manure is consequently less rich than that from fattening steers, which do not retain more than 10 per cent of such constituents.

*General Conclusions.*—A consideration of the foregoing statements permits us to make the following summary:—

1. That the manures, both solid and liquid, of the various farm animals differ in value, that is, in the proportions of nitrogen, phosphoric acid and potash they contain.

2. That food is the most important factor in determining the value of the resulting manure; the richer the food, the richer the manure. The quantity voided also is largely dependent upon the amount of food consumed and water drunk.

3. That the manure of mature animals, other things being equal, is richer than that of young and growing stock.

4. That animals producing milk, wool, &c., make a greater draft upon their food than fattening stock or those which are mature and at rest or working. The manure of the former will not, consequently, be as rich as that of the latter.

We have also learnt that of the nitrogen, phosphoric acid and potash in the food supplied, by far the greater part (probably, as a rule, about 80 per cent) is returned in the excrement. Further, that both in nitrogen and potash, urine is much richer than the solid excrement, but the latter contains practically all the phosphoric acid excreted. The greater value of the urine, by reason of the solubility of its plant food, has also been observed. This fact points to the advisability of using a sufficiency of litter or absorbents in the stable, &c., so that the solid and liquid excreta may be applied together to the soil, for the best results are undoubtedly obtained by such a method.

## Amount and Value of Manure produced by Farm Animals.

The amount of "dry matter" contained in the solid and liquid excrements is approximately one-half of the dry matter of the food consumed. The composition of this dry matter, respecting nitrogen, phosphoric acid and potash, is largely dependent, as we have already

seen, upon the percentages of these constituents in the food. The total quantity of manure produced depends upon the amount of food and water consumed by the animal.

Some years ago investigations were made at the Cornell (N.Y.) Experiment Station to determine the amount and value of the manure produced by various farm animals when liberally fed and given a sufficiency of bedding. The results obtained, calculated to the basis of 1,000 pounds live weight, are as follows:—

| — | Amount per day. | Value per day. | Value per year. |
|---|---|---|---|
| | Lbs. | Cents. | $ · cts. |
| Sheep | 34·1 | 7·2 | 26 09 |
| Calves | 67·8 | 6·2 | 24 45 |
| Pigs | 83·6 | 16·7 | 60 88 |
| Cows | 74·1 | 8·0 | 29 27 |
| Horses | 48·8 | 7·6 | 27 74 |

The fertilizing constituents and value per ton of the above are given in the subjoined table.

| — | Water. | Nitrogen. | Phosphoric Acid. | Potash. | Value per ton. |
|---|---|---|---|---|---|
| | Per cent. | Per cent. | Per cent. | Per cent. | $ cts. |
| Sheep | 59·52 | 0·768 | 0·391 | 0·591 | 3 30 |
| Calves | 77·73 | 0·497 | 0·172 | 0·532 | 2 18 |
| Pigs | 74·13 | 0·840 | 0·390 | 0·320 | 3 29 |
| Cows | 75·25 | 0·426 | 0·290 | 0·440 | 2 02 |
| Horses | 48·69 | 0·490 | 0·260 | 0·480 | 2 21 |

In connection with the above data, it should be remembered that they have been obtained from liberally fed animals, and further, that care was taken that all the excrements, both solid and liquid, were carefully preserved by litter and absorbents. It is quite probable that on many of our farms the manure as applied to the field does not average per head more than half the above values.

Heiden, Boussignault, and others have also made careful experiments in this connection. Their results may be condensed as follows:—A well-fed horse produces from 5 to 6 tons of manure per annum, during the time he is in the stable. A steer of 1,000 pounds produces about 20 tons of manure a year. A sheep weighing 60 pounds would produce about three-fourths of a ton, and a pig from 2 to 3 tons of manure yearly. These amounts include the necessary bedding to keep the animals comfortable.

## Composition of Manure in General.

Having learnt that there are many factors affecting the quality of barn-yard manure, it is not a matter of surprise to know that this fertilizer as found upon our farms is extremely variable in composition. While this in part is due to the character of the food of the animal, the writer is convinced that it is more largely due to imperfect means of absorbing and retaining the liquid portion of the manure. The fault frequently begins in the farm buildings through insufficiency of litter or absorbent, and is continued by the leaching out of the most valuable part in the barn-yard.

In speaking of the composition of barn-yard manure in general, it is consequently impossible to do more than state results that have been obtained by different workers. The following figures are from mixed horse and cow manure, and do not include results of leached or imperfectly preserved manures:—

FERTILIZING CONSTITUENTS IN BARN-YARD MANURE.

| Barn-yard Manure. | Pounds per Ton. Nitrogen. | Phosphoric Acid. | Potash. |
|---|---|---|---|
| Manure, fresh, average, many analyses | 7·8 | 3·6 | 9·0 |
| " rotted " " | 10·0 | 5·6 | 10·6 |
| " rotted, C. E. F. | 10·3 | 8·5 | 15·9 |
| " rotting during fermentation, C. E. F. | 9·8 | 6·0 | 13·6 |
| " well rotted, C. E. F., one year old* | 17·7 | 14·6 | 29·9 |
| " from Rothamsted | 12·8 | 4 6 | 10·0 |

* Although, as seen from the figures, this manure is extremely rich, it is to be remembered that in the rotting the sample was reduced from 8,000 lbs. to 2,659 lbs. and that the results showed that under the conditions of the experiment considerable loss of fertilizing ingredients had taken place. (See Report of the Farms, 1896.)

The following table gives the average analysis of manure from the various farm animals. The manure in each case consisted of the excreta plus bedding:—(From Bulletin No. 56, Cornell Exp. Station)—

ANALYSIS AND VALUE PER TON OF VARIOUS FARM MANURES.

| Kind of Manure. | Number of Experiments. | Nitrogen. | Phosphoric Acid. | Potash. | Water. | *Value per ton. |
|---|---|---|---|---|---|---|
| | | Per cent. | Per cent. | Per cent. | Per cent. | $ cts. |
| Sheep | 6 | ·7675 | ·391 | ·591 | 59·52 | 3 30 |
| Calves | 2 | ·497 | ·172 | ·532 | 77·73 | 2 17 |
| Pigs | 3 | ·84 | ·39 | ·32 | 74·13 | 3 29 |
| Cows | 4 | ·426 | ·29 | ·44 | 75·25 | 2 02 |
| Horses | 1 | ·49 | ·26 | ·48 | 48·69 | 2 21 |

*Valuing nitrogen at 15·5 cents and phosphoric acid and potash at 4·5 cents per lb.

## Poultry Manure.

Though not a large asset on the ordinary farm, poultry manure is so rich that it well merits more attention than it now receives. As both the liquid and solid excreta are voided together, the result is a manure containing large percentages of nitrogen, phosphoric acid and potash.

Analysis and value per ton of poultry manure:

| | | |
|---|---|---|
| Water | per cent. | 56·0 |
| Nitrogen | " | ·8 to 2·0 |
| Phosphoric acid | " | ·5 to 2·0 |
| Potash | " | ·8 to ·9 |
| Value, from | | $5 00 to $8.50 |

The composition of the manure will depend largely on the character of the food: thus, that from hens fed with green bone and a mixture of grain will be more valuable than that from those fed with Indian corn exclusively.

Hen manure quickly ferments and will lose much of its nitrogen if not preserved with absorbents. Lime and wood ashes should not be used for this purpose. Dry loam or muck, moss litter from peat bogs, road dust, are all useful absorbents for the floor of the poultry house.

## Litter.

The quantity and quality of the litter necessarily affects the composition of the resultant manure; we may, therefore, briefly consider the nature of those materials commonly used to furnish farm animals a comfortable bedding and to absorb and retain the liquid excrement. The following data are given by Warington:—

MANURIAL CONSTITUENTS IN 100 PARTS OF LITTER.

| —— | Nitrogen. | Phosphoric Acid. | Potash. |
|---|---|---|---|
| Dead leaves | 0·8 | 0·3 | 0·3 |
| Straw | 0·4 to 0·6 | 0·2 to 0·3 | 0·6 to 1·6 |
| Peat moss | 0·8 | Trace. | Trace. |
| Sawdust | 0·2 to 0·7 | 0·3 | 0·7 |
| Spent tan | 0·5 to 1·0 | | |
| Peat | 1·0 to 2·0 | | |

*Straw* is the almost universal bedding material. It, however, strongly resists fermentation, and hence its fertilizing constituents are

not so valuable, pound for pound, as those in the excrements. Cut straw has a greater absorbent value than long straw.

*Moss litter* is an excellent absorbent, holding many times its own weight of liquid. It is comparatively rich in nitrogen, and both chemical analysis and field results have shown it to produce a very valuable manure. The following table gives the composition of several samples of Canadian moss-litter as ascertained in the Farm laboratories:—

ANALYSIS OF MOSS LITTER.

| Designation. | Locality. | Moisture. | Ash. | Nitrogen. | Absorptive Capacity. |
|---|---|---|---|---|---|
| Artificially dried.......... | Musquash, N.B..... | 23·01 | 1·06 | 0·57 | 623 |
| Open air dried........... | " " ..... | 19·44 | 1·45 | 0·71 | 905 |
| Upper layer............ | Rusagornis, N.B.... | 14·28 | 0·84 | 0·51 | 1666 |
| " loose.......... | Point Cheval, N.B.. | 13·53 | 2·30 | 0·38 | 1834 |
| Lower layer compact...... | " " .. | 14·25 | 7·88 | 0·48 | 1166 |
| " " ....... | Big Plain Bog, N.S. | 15·7 | 1·8 | ·527 | 1395 |
| " " ....... | Weldon Bog, N.S... | 16·20 | 2·05 | ·596 | 1533 |

*Air-dried swamp muck* has also a high value, both for the nitrogen it contains and its power to absorb and retain the liquid excrement. As it occurs widely throughout the Dominion, its use in and about the farm buildings should be more general than at present. It is in conjunction with straw that this material can be best employed as a litter, but it can also with advantage be mixed with the manure in the barnyard. The reports of the Chemist of the Experimental Farms during the past eight years contain the analyses of many samples of swamp muck and peat from various parts of Canada, and the data go to show that in these materials we have a vast store of plant food that might readily be made available.

The following table shows the composition of average samples of Canadian swamp muck (air-dried). The data have been taken, without any special selection, from the reports of the Chemical Division, C. E. F.:—

ANALYSIS OF SWAMP MUCK (AIR-DRIED).

| Locality. | Nitrogen. | Organic Matter. | Moisture. |
|---|---|---|---|
| Victoria, B.C | 2·23 | 66·02 | 23·55 |
| Chilliwack, B.C | 3·51 | 79·14 | 9·37 |
| Alberni, B.C | 2·47 | 71·77 | 17·59 |
| *Regina, N.W.T | 1·66 | 39·22 | 9·90 |
| Ompah, Ont | 2·37 | 69·59 | 7·89 |
| Phillipsville, Ont | 1·87 | 65·22 | 14·72 |
| St. Williams, Ont. | 1·01 | 31·93 | 5·52 |
| Shawville, Que | 2·27 | 73·92 | 18·59 |
| St. Adelaide de Pabos, Que | 2·30 | 68 58 | 10·03 |
| Bishop's Crossing, Que | 1·74 | 77·04 | 11·56 |
| Norton Station, N.B | 1·18 | 78·66 | 4·02 |
| Shediac, N.B | 2·15 | 69·30 | 10·06 |
| Chatham, N.B | 1·65 | 75·15 | 15·01 |
| Antigonish, N.S | 2 19 | 80·80 | 9·68 |
| Grove's Point, N.S | 1·82 | 78·99 | 12·85 |
| Waterville, N.S | 1·68 | 75·34 | 7·76 |
| Orwell, P.E.I | 1·86 | 73·01 | 14·57 |
| Aitken's Ferry, P.E.I | 2·54 | 67·89 | 11·84 |
| Egmont Bay, P.E.I | 1·51 | 71·43 | 15·96 |

* From the bottom of a slough.

## THE PRESERVATION AND APPLICATION OF MANURE.

*The Causes, Conditions and Results of Fermentation.*—Fermentation, or rotting, is brought about by the agency of certain microscopic plants known as bacteria. The extent of the fermentation, a process which necessarily means a greater or less loss of the organic matter and nitrogen of the manure, will depend chiefly upon the temperature, moisture and the amount of air throughout the heap. Rotting is not a simple process, the decomposition that takes place resulting from the development of two classes of bacteria, (1) aerobic, or those requiring the oxygen of the air for their existence, and (2) anaerobic, or those which can develop in an atmosphere destitute of oxygen. As the conditions for their development are different, so are the compounds produced by their life functions. The manure on the top and sides of the heap is freely permeated by air. It is here that the aerobic ferments set up a combustion of the organic matter, which is burnt by union with the oxygen of the air in the interstices of the manure, forming carbonic acid. Much heat in consequence of this combustion is generated. Fire-fanging is the result of excessive fermentation of this character, usually caused by lack of sufficient moisture. Lower in the heap, the heat decreases, since there the aerobic ferments cannot live for want of air. The anaerobic ferments that thrive at the bottom of the heap disengage marsh gas as well as carbonic acid, and produce but little heat. In the superficial layers the soluble carbo-hydrates

(gum, sugar, &c.,) are burnt; in the lower part of the heap, the cellulose or fibre is principally decomposed.

Bacteria are present in both the solid and liquid portions of manures, but, as it has been already stated, it is more especially in the latter that they find a favourable medium for their growth. Drenching the manure heap with the drainage liquid, therefore, not only affords the necessary moisture to retain the ammonia, but also introduces ferments which act beneficially.

We have hitherto considered the action of the bacterial ferments on the non-nitrogenous compounds of manure. It now remains to be stated that the nitrogen of urine and dung may in part be liberated as free nitrogen or in part converted into ammonia and finally into nitrates by their agency. The alkaline fluid produced by the solution of the ammonia in the liquids of the dung is able to dissolve unattacked nitrogenous substances both in the litter and dung, thus preparing for assimilation much plant nourishment otherwise valueless. Rotting or fermentation results in the breaking down or destruction of organic structure in the dung and litter, humus-forming materials being produced. For this reason the mass of rotted manure is more uniform and homogeneous than fresh manure.

Fermentation always entails a loss of organic matter; it also means an escape of a part of the nitrogen. The looser the pile, the greater will be the deterioration. Fire-fanging is injurious to the quality of manure, and results, as already remarked, chiefly from an insufficiency of moisture. Liquid excrement by itself rapidly loses in value, its nitrogen escaping as carbonate of ammonia. These facts point to the great desirability of controlling fermentation, (1) by fermenting the solid and liquid excreta together (this can only be accomplished by using a sufficiency of litter or absorbent), (2) by fermenting "hot" and "cold" (horse and sheep excreta belong to the first class, that from the cow and pig are of the latter class) manures together, (3) by keeping the heap compact and moist, thus excluding excess of air. Fermentation must be regulated and controlled by these means or the losses that ensue will more than out-balance the benefits to be gained.

Weight for weight, rotted manure is more valuable than fresh manure. The losses during fermentation are principally in the destruction of the organic matter and loss of nitrogen and do not, *under the best farm conditions*, lead to much loss of phosphoric acid and potash. It might be possible with a perfectly tight concrete floor to prevent all loss from drainage, but as the potash is extremely soluble it is impos-

sible without such means to prevent some loss of this element. The decrease in weight that takes place, due chiefly to the combustion or burning away of the organic matter, will depend upon the extent of the fermentation. Some of the nitrogen will always escape, either in the free state or as ammonia, but under right conditions of fermentation the percentage of this element will always be found to be considerably greater in rotted than in fresh manure.

The advantages gained by rotting may be enumerated briefly as follows:—The manure becomes disintegrated and of uniform character throughout, allowing an easier and more uniform distribution in the field and a more intimate mixing with the soil; the coarse litter is decomposed and its plant food thus made more available; compounds are formed from the organic matter that more readily produce humus within the soil; the availability of the nitrogen of the solid portion of the manure is increased; the phosphates are made more assimilable; there is less weight of manure to haul to the fields; the larger number of weed seeds that may be present are destroyed.

## Experiments in Rotting Manure.

A number of experiments in the rotting of manure have been made during the last three years at the Central Experimental Farm, Ottawa. The results will be found in detail in the report of the chemist for 1898, but we may insert here some of the data, as they will be of interest in this connection. The manure experimented with was composed of equal parts of horse and cow manure. Four tons of this mixed manure were placed in a weather-tight shed, and an equal amount placed exposed in outside box or bin, open to the weather, but with flooring and sides of wood in good condition and practically water-tight (see illustration). These manures were weighed and analysed monthly for the period of a year. The more important results obtained have been summarized, and are contained in the following table:—

WEIGHTS OF FERTILIZING CONSTITUENTS IN "PROTECTED" AND "EXPOSED" MANURES.

| | Fresh. | | At the end of 3 months. | | At the end of 6 months | | At the end of 9 months. | | At the end of 12 months. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Protected. | Exposed. | Protected. | Exposed. | Protected. | Exposed. | Protected. | Exposed. | Protected. | Exposed. |
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Weight of manure | 8,000 | 8,000 | 2,980 | 3,903 | 2,308 | 4,124 | 2,224 | 4,189 | 2,185 | 3,838 |
| Organic matter | 1,938 | 1,938 | 880 | 791 | 803 | 652 | 760 | 648 | 770 | 607 |
| Total nitrogen | 48 | 48 | 40 | 34 | 39 | 33 | 37 | 29 | 37 | 31 |
| *Total phosphoric acid | 25 | 25 | 25 | 23 | 26 | 22 | 25 | 21 | 24 | 21 |
| †Available phosphoric acid | 15 | 15 | 20 | 15 | 19 | 15 | 21 | 17 | 19 | 16 |
| *Total potash | 62 | 62 | 65 | 48 | 59 | 44 | 60 | 41 | 60 | 40 |
| †Available potash | 54 | 54 | 62 | 45 | 52 | 42 | 56 | 38 | 55 | 35 |

* Soluble in strong hydrochloric acid. † Soluble in dilute citric acid.

The data in the above table are calculated from the percentage composition and the weight of the manures at the periods indicated. The great difficulty in obtaining thoroughly representative samples for analysis from such a large mass of wet material composed of several constituents (straw, dung, &c.) renders *absolutely exact* results practically impossible. The apparent discrepancies here noticeable are, however, so slight that the general accuracy of the work cannot be doubted. Indeed, the figures prove that the greatest care has been taken, both in the sampling, the analysis and the weighing of the manures.

From the foregoing, the subjoined data have been calculated, showing the losses of fertilizing constituents that ensue under the different systems of preservation.

LOSS OF FERTILIZING CONSTITUENTS IN THE ROTTING OF MANURE.

| Fertilizing Constituents. | At the end of 3 months. | | At the end of 6 months. | | At the end of 9 months. | | At the end of 12 months. | |
|---|---|---|---|---|---|---|---|---|
| | Protected. | Exposed. | Protected. | Exposed. | Protected. | Exposed. | Protected. | Exposed. |
| | per cent. | per cent. | per cent. | per cent. | per cent. | per cent. | per cent. | per cent. |
| Loss of organic matter | 55 | 60 | 58 | 65 | 60 | 67 | 60 | 69 |
| Loss of nitrogen | 17 | 29 | 19 | 30 | 23 | 40 | 23 | 40 |
| Loss of phosphoric acid | None. | 8 | None. | 12 | None. | 16 | 4 | 16 |
| Loss of potash | None. | 22 | 3 | 29 | 3 | 34 | 3 | 36 |

The most important conclusions from the above are, (1) that the chief losses take place chiefly during the first three months of rotting, (2) that about 10 per cent more organic matter is destroyed in "exposed" than in "protected" manure, (3) that nearly twice as much nitrogen escapes from the "exposed" than from the "protected" manure, (4) that while the phosphoric acid and potash remain practically constant throughout in the protected manure, the losses of these elements, especially of the potash, are very considerable from the exposed manure.

As an offset against these losses, fermentation has broken down or decomposed the litter, has converted the nitrogenous matter into substances that more readily form humus in the soil, has increased somewhat the availability of the phosphoric acid and in all probability has destroyed the greater number of the weed seeds that might be present.

In directing attention to the foregoing results we think it well to emphasize the fact that the "exposed" sample of our experiments was rotted under much better conditions and circumstances as regards protection from loss by drainage than exist ordinarily upon farms. The losses from rotting manure upon farms in general must exceed many times those recorded here.

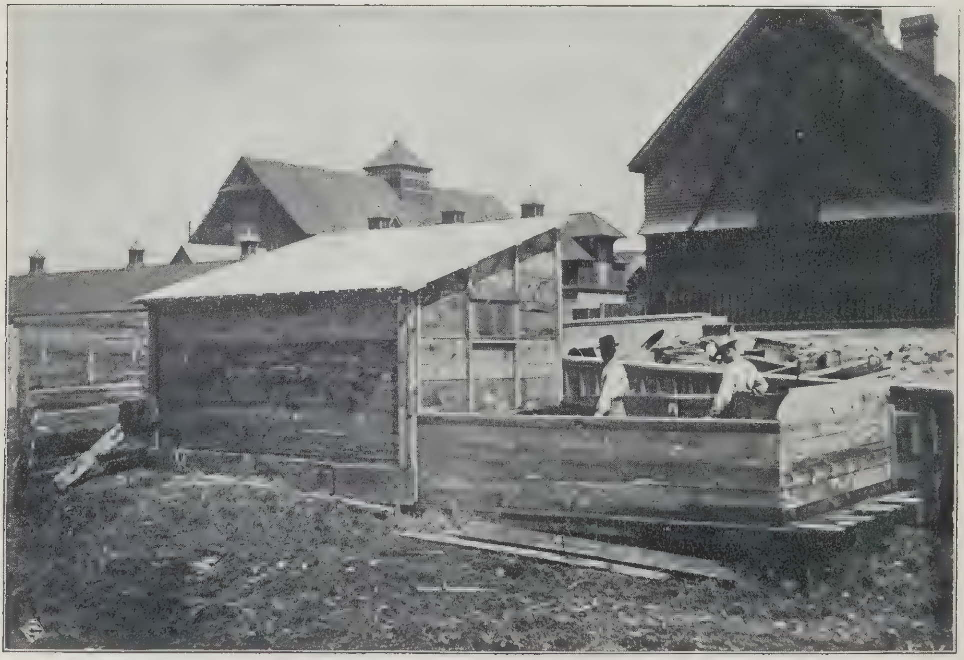
*Leaching.*—This in Canada undoubtedly causes more loss than excessive fermentation. When the drainings of a manure pile exposed to rain are allowed to run off and escape there is great loss in the available, and hence more valuable, organic and mineral plant food elements. Such "washed" manure is worth but a fraction of its original value. This depreciation before the manure is carted to the fields may, and frequently does, exceed 50 per cent of its value as it came from the stable and barn. The greatest loss is in potash, nitrogen and soluble organic compounds coming next. The more active the fermentation has been, the greater will be the deterioration if the pile is afterwards subjected to leaching. Thus it is that large piles of manure by rotting and leaching in open yards and on fields subject to flooding suffer deterioration and are reduced in value. If under the most favourable circumstances losses of plant food occur during the fermentation of manure, what must be the waste upon many of our farms where from the manure pile, frequently situated upon a hillside or steep incline, streams of fertility leached out by rains and the drippings from the roofs of the farm buildings, issue forth to find their way to the creek or river.

Samples of the dark, almost black, liquid, draining from manure piles in four barn-yards yielded the following results to analysis:—

COMPOSITION OF MANURE LEACHINGS.

| Fertilizing Constituent. | In 1,000 Parts. | | | |
|---|---|---|---|---|
| | No. 1. | No, 2. | No. 3. | No. 4. |
| Nitrogen | ·511 | 1·14 | 1·60 | ·03 |
| Phosphoric acid | ·104 | ·038 | ·10 | ·03 |
| Potash | 2·660 | 1·980 | 4·90 | 1·89 |

The leaching of Manure. This pond has been produced by leaching and drainage from the pile of manure upon its further side.



Building and open bin used in manure preservation experiments. Men engaged in sampling and weighing manure.

When it is remembered that all this plant food is in solution, the great value of these drainings will be apparent. Though in many instances, owing to copious showers, the drainage water from the manure pile may not be so rich as those above recorded, it is evident that there must be a very large loss, especially in potash, every year from this cause on many farms.

*Losses in the Stable.*—The readiness and rapidity with which urine decomposes has already been emphasized. The first loss from this cause, as well as from wasteful drainage, occurs in the stable and points to the economy of using there a tight floor and an absorbent that will fix and retain the volatile ammonia. Gypsum is such an absorbent, and used in conjunction with the bedding will be found a valuable preventive of loss of nitrogen. Dry swamp muck, an excellent absorbent, can also be recommended for the cow stable, pig pen or other places in and about the farm buildings where there is liquid manure likely to go to waste. By the use of such materials both the bulk of the manure may be increased and its quality improved. Careful experiments have shown that the loss in the stable often exceeds that in the manure pile; the use of absorbent will tend to reduce the loss in both places.

## The Application of Manure.

*The Relative Merits of Rotted and Fresh Manures.*—The advantages of rotted over fresh manure have already been studied; it has also been seen, on the other hand, that even under a good system of preservation, rotting must be accompanied by loss of fertilizing constituents. Weight for weight, rotted manure is more valuable than fresh manure, containing larger percentages of plant food and having these elements in a more available condition, but the losses in rotting may, and frequently do, out-balance the benefits. Undoubtedly the safest storehouse for manure is the soil. Once in the soil, the only loss that can occur is through drainage away of the soluble nitrates, and this is usually very slight, indeed it is not to be compared with the loss of nitrogen in the fermenting manure heap. We, therefore, unhesitatingly say that the farmer who gets his manure while still fresh into the soil returns to it for the future use of his crops much more plant nourishment than he who allows the manure to accumulate in piles that receive little or no care, and which, therefore, must waste by excessive fermentation or leaching, or both.

With regard to the respective effects of fresh and rotted manures on different classes of soil, it may be stated that fresh manure is better for

clays and heavy loams, since it does much to improve their physical condition by opening them to the air and making them more friable. On the other hand, rotted manure is better suited to light and sandy soils, tending to make them more compact and retentive of moisture.

Fresh manure may with advantage be used for crops which have a long season of growth, while rotted manure, with its more available plant food, will give better results for such as gather their food and reach maturity during a shorter period. Excess of fresh manure tends to rankness of growth and the undue development of foliage, and is frequently the cause of "lodging" in grain and too much "top" or leaves in root crops.

*The Drying Out of Manure on the Field.*—While considering the matter of the application of manure, we may take occasion to answer the question so frequently asked: does manure spread and allowed to dry out upon the field, lose any of its nitrogen? In 1892 we conducted some experiments which proved conclusively that the loss from volatilization of ammonia when the manure was spread in thin layers and allowed to dry out, was so very small that it could be disregarded. It appears that in manure so treated, fermentation is at once arrested. The following are the results we obtained:—

LOSS OF NITROGEN IN FARM-YARD MANURE BY DRYING OUT IN THIN LAYERS.

| No. | Manure. | | Per cent. | Amount per ton in lbs. | P. c. lost on exposure. | Value at 17c. per lb |
|---|---|---|---|---|---|---|
| | | | | | | $ cts. |
| 1 | Well rotted; after fermentation. | Before exposure... | ·515 | 10·3 | ...... | 1 75 |
| | | After " ... | ·505 | 10·1 | ·01 | 1 72 |
| 2 | Rotting; during fermentation. | Before exposure... | ·490 | 9·8 | ...... | 1 67 |
| | | After " ... | ·466 | 9·3 | ·024 | 1 58 |

The above data, of course, do not in any way contradict the statement that great losses of plant food may, and often do, occur in the field. When fertilizing material washed from the spread manure is received by the soil, it is there retained for future crop use, but if the field, by reason of its location is subject to flooding, or the ground is frozen—preventing the percolation of the leachings—much of the best and most valuable part of the manure is undoubtedly carried away and practically lost to the farmer.

*The Frequency of Application.*—The present opinion, as gathered from experience, is that it is better rather to feed the crop than to try to permanently improve the soil, though, of course, both are intimatly connected, and one cannot be done without in a large measure accomplishing the other. However, the principle here stated points to the advisability of light and frequent dressings rather than heavier applications at longer intervals, and there can be no doubt but that it is more profitable to dress with ten tons every second year than to apply twenty tons every fourth year.

DEPARTMENT OF AGRICULTURE

CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

# RESULTS OBTAINED IN 1898

FROM

# TRIAL PLOTS

OF

# GRAIN, FODDER CORN,

# AND ROOTS,

BY

WM. SAUNDERS, LL.D.,
*Director Experimental Farms.*

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PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE

To the Honourable
The Minister of Agriculture.

SIR,—I beg to submit for your approval Bulletin No. 32 of the Experimental Farm series, prepared by myself. In this publication there will be found the results of a large number of experiments which have been carried on at all the experimental farms during the season of 1898, with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots and potatoes in uniform plots. The average results are also given of four years tests with uniform plots of oats, barley, spring wheat and potatoes, three and four years' experience with plots of Indian corn and turnips and three years' experience with varieties of pease, mangels and carrots.

This work has been undertaken with the object of gaining information as to the relative productiveness and earliness of the many varieties under test. The results show wide variations in the weight of the crops grown and point to the importance of greater care in choosing varieties of seed for sowing. It is hoped that the information given, covering the experience gained under many of the more important climatic variations found in the Dominion will be useful to farmers in every part of Canada.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, 12th December, 1898.

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# RESULTS OBTAINED IN 1898

FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN, AND ROOTS

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By William Saunders, LL.D., F.R.S.C., F.L.S., &c.

*Director Experimental Farms.*

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An annual Bulletin has been published for the past three years giving particulars of the crops obtained from a large number of test plots of cereals, fodder corn, roots, &c., grown annually at each of the Experimental Farms. During the season of 1898 these several lines of work have been continued, the results of which will be found in the present bulletin. It is hoped that the prompt issue of the particulars as to relative yield and earliness of ripening of the different sorts under test, in a form convenient for reference, will be helpful to Canadian farmers, by giving information as to the most promising varieties for sowing during the coming season.

In conducting these experiments the several crops referred to have been grown on blocks of land as nearly uniform as possible in character, with an area sufficient in each case to include all the varieties of one sort of grain. The size of the plots has varied from one-tenth to one-fortieth of an acre, and all those of one group have usually been sown on the same day, or within two days, so that each variety might be grown under the same conditions. The seed used has been uniform in character and the quantity sown per acre and the manner of sowing or planting has been the same in each case.

These experiments have been undertaken for the purpose of gaining information as to the relative productiveness, when grown under similar conditions, of the many varieties under trial, of these important farm crops, also to ascertain their periods of ripening, in the different climates of this country.

Particulars are given of the crops produced at each of the Experimental Farms, from all the varieties sown, also the average yield obtained at all these farms. The different sorts are arranged in the order of their productiveness at the Central Experimental Farm at Ottawa, and the time required for their maturing is also given.

The season of 1898 was favourable in nearly all parts of the Dominion, and the crops obtained at all the Experimental Farms have, in nearly every instance, been above the average.

## TRIAL PLOTS OF OATS.

Sixty-five varieties of oats have been tested during the season of 1898. These include eleven of the new cross-bred sorts, which have been produced at the Experimental Farms, namely, Brandon, Holland, Russell, King, Pense, Master, Oxford, Olive, Miller, Cromwell and Medal. The size of the plots on which the oats were grown, was one-twentieth of an acre at Brandon, Man., one-tenth of an acre at Indian Head, N. W. T., and one-fortieth of an acre each at Ottawa, Ont., Nappan, N. S., and Agassiz, B. C. The quantity of seed sown of each variety, was in the proportion of two bushels per acre and the dates of sowing were as follows:—At Ottawa, 15th and 16th April; Nappan, 11th May; Brandon, 30th April; Indian Head, 2nd May; and at Agassiz, 18th April.

Particulars as to the character of the land in each case, also its preparation and treatment will be found in the Annual Report of the Experimental Farms for 1898.

### UNIFORM TEST PLOTS OF OATS.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1898. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Hazlett's Seizure | 89 | 14 | 38 | 28 | 93 | 18 | 53 | 18 | 50 | .. | 65 | 2 | 103 | 97 | 118 | 117 | 115 | 111 |
| 2 | Joanette | 86 | 16 | 30 | 20 | 87 | 22 | 54 | 24 | 45 | 30 | 61 | 2 | 109 | 97 | 117 | 116 | 114 | $110\frac{3}{5}$ |
| 3 | Brandon | 80 | 30 | 30 | 20 | 78 | 8 | 61 | 16 | 43 | 28 | 59 | .. | 110 | 103 | 119 | 133 | 115 | 116 |
| 4 | Oderbruch | 80 | 30 | 47 | 2 | 97 | 2 | 75 | .. | 48 | 8 | 69 | 15 | 109 | 100 | 117 | 133 | 117 | $115\frac{1}{5}$ |
| 5 | Golden Beauty | 80 | 20 | 35 | 10 | 93 | 18 | 65 | 20 | 59 | 14 | 66 | 30 | 106 | 101 | 111 | 117 | 115 | 110 |
| 6 | Black Mesdag | 80 | .. | 42 | 32 | 65 | 10 | 29 | 24 | 58 | 8 | 55 | 8 | 104 | 97 | 114 | 114 | 108 | $107\frac{2}{5}$ |
| 7 | Early Golden Prolific | 79 | 14 | 35 | 10 | 97 | 22 | 70 | 20 | 48 | 18 | 65 | 30 | 105 | 100 | 116 | 117 | 117 | 111 |
| 8 | Improved Ligowo | 78 | 32 | 25 | 10 | 87 | 2 | 51 | 26 | 54 | 14 | 59 | 17 | 106 | 97 | 116 | 115 | 116 | 110 |
| 9 | Holland | 78 | 18 | 28 | 8 | 94 | 24 | 65 | 30 | 48 | .. | 63 | 2 | 115 | 103 | 121 | 124 | 114 | $115\frac{2}{5}$ |
| 10 | Flying Scotchman | 78 | 18 | 41 | 6 | 85 | 10 | 60 | 10 | 44 | 24 | 62 | .. | 106 | 94 | 104 | 117 | 113 | $106\frac{4}{5}$ |
| 11 | Russell | 78 | 8 | 28 | 8 | 86 | 16 | 61 | 16 | 50 | 20 | 61 | .. | 110 | 103 | 116 | 133 | 114 | $115\frac{1}{5}$ |
| 12 | King | 77 | 23 | 31 | 26 | 79 | 14 | 67 | 2 | 44 | 24 | 60 | 4 | 110 | 100 | 111 | 133 | 116 | 114 |
| 13 | Abundance | 76 | 26 | 48 | 8 | 94 | 4 | 67 | 22 | 51 | 6 | 67 | 20 | 107 | 98 | 111 | 117 | 116 | $109\frac{4}{5}$ |
| 14 | Pense | 76 | 26 | 22 | 12 | 106 | 16 | 66 | 26 | 47 | .. | 63 | 29 | 110 | 101 | 117 | 133 | 116 | $115\frac{2}{5}$ |
| 15 | Banner | 75 | 30 | 44 | 24 | 106 | 6 | 72 | 2 | 57 | 32 | 71 | 12 | 105 | 100 | 117 | 117 | 115 | $110\frac{4}{5}$ |
| 16 | Early Archangel | 75 | 30 | 34 | 4 | 92 | 32 | 67 | 22 | 57 | 22 | 65 | 22 | 104 | 98 | 111 | 127 | 116 | $111\frac{1}{5}$ |
| 17 | White Giant | 75 | 10 | 42 | 12 | 114 | 4 | 60 | 20 | 61 | 18 | 70 | 26 | 107 | 100 | 118 | 117 | 115 | $111\frac{2}{5}$ |
| 18 | Master | 75 | .. | 33 | 18 | 87 | 2 | 57 | 2 | 50 | 10 | 60 | 20 | 111 | 101 | 116 | 133 | 113 | $114\frac{4}{5}$ |
| 19 | American Triumph | 74 | 4 | 31 | 26 | 105 | 30 | 68 | 18 | 64 | 4 | 68 | 30 | 104 | 102 | 117 | 126 | 114 | $112\frac{3}{5}$ |
| 20 | Columbus | 73 | 28 | 48 | 8 | 91 | 6 | 76 | 16 | 56 | .. | 69 | 5 | 103 | 98 | 116 | 127 | 114 | $111\frac{3}{5}$ |
| 21 | Newmarket | 73 | 18 | 34 | 4 | 99 | 14 | 65 | 20 | 50 | 20 | 64 | 22 | 103 | 98 | 118 | 127 | 114 | 112 |
| 22 | Wallis | 73 | 8 | 38 | 28 | 94 | 4 | 67 | 22 | 55 | 20 | 65 | 30 | 106 | 100 | 118 | 117 | 115 | $111\frac{1}{5}$ |
| 23 | Thousand Dollar | 72 | 22 | 50 | .. | 104 | 4 | 49 | 14 | 52 | 32 | 65 | 28 | 104 | 97 | 111 | 116 | 108 | $107\frac{1}{5}$ |
| 24 | White Schonen | 72 | 12 | 45 | 10 | 104 | 4 | 63 | 28 | 50 | 15 | 67 | 7 | 103 | 100 | 119 | 117 | 116 | 111 |
| 25 | Mortgage Lifter | 72 | 12 | 34 | 4 | 77 | 22 | 57 | 12 | 56 | 26 | 59 | 22 | 103 | 97 | 117 | 117 | 113 | $109\frac{2}{5}$ |
| 26 | Early Gothland | 72 | 12 | 33 | 18 | 74 | 4 | 70 | 10 | 55 | 20 | 61 | 6 | 110 | 100 | 118 | 133 | 114 | 115 |
| 27 | Golden Giant | 70 | 20 | 40 | .. | 87 | 2 | 59 | 14 | 46 | 20 | 60 | 24 | 116 | 103 | 120 | 133 | 117 | $117\frac{4}{5}$ |
| 28 | Mennonite | 70 | 20 | 42 | 12 | 108 | 28 | 56 | 6 | 57 | 2 | 67 | .. | 106 | 101 | 117 | 117 | 113 | $110\frac{4}{5}$ |
| 29 | Bavarian | 70 | 20 | 44 | 24 | 109 | 14 | 71 | 26 | 66 | 16 | 72 | 20 | 113 | 100 | 118 | 117 | 115 | $112\frac{3}{5}$ |
| 30 | Early Blossom | 70 | 20 | 43 | 18 | 85 | 30 | 71 | 26 | 54 | 24 | 65 | 10 | 108 | 101 | 119 | 127 | 116 | $114\frac{1}{5}$ |
| 31 | Oxford | 70 | 10 | 24 | 4 | 106 | 16 | 51 | 6 | 50 | 10 | 60 | 16 | 106 | 101 | 118 | 133 | 116 | $110\frac{4}{5}$ |
| 32 | Olive | 68 | 8 | 27 | 22 | 98 | 28 | 65 | 30 | 51 | 16 | 62 | 14 | 106 | 97 | 117 | 133 | 116 | $113\frac{4}{5}$ |
| 33 | Miller | 65 | 30 | 28 | 8 | 84 | 4 | 68 | 18 | 47 | 28 | 58 | 31 | 106 | 100 | 120 | 133 | 116 | 115 |

## Uniform Test Plots of Oats.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1898. Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Number of Days from Sowing to Harvesting. Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 34 | Coulommiers.......... | 65 | 30 | 27 | 22 | 75 | 10 | 66 | 16 | 55 | .. | 58 | 2 | 116 | 105 | 132 | 127 | 121 | 120$\frac{1}{5}$ |
| 35 | Buckbee's Illinois..... | 64 | 8 | 31 | 26 | 97 | 2 | 79 | 14 | 44 | 4 | 63 | 10 | 105 | 105 | 118 | 127 | 116 | 114$\frac{1}{5}$ |
| 36 | Lincoln............... | 63 | 28 | 48 | 8 | 94 | 4 | 69 | 4 | 59 | 4 | 66 | 30 | 104 | 98 | 116 | 117 | 115 | 110 |
| 37 | Improved American... | 63 | 18 | 31 | 6 | 98 | 28 | 72 | 22 | 50 | 30 | 63 | 14 | 104 | 100 | 118 | 127 | 116 | 113 |
| 38 | American Beauty.. ... | 63 | 18 | 40 | .. | 113 | 18 | 75 | .. | 51 | 26 | 68 | 26 | 104 | 100 | 116 | 117 | 116 | 110$\frac{3}{5}$ |
| 39 | Doncaster Prize....... | 63 | 18 | 42 | 32 | 72 | 12 | 54 | 14 | 45 | 30 | 55 | 28 | 110 | 98 | 116 | 127 | 114 | 113 |
| 40 | Early Maine......... | 62 | 32 | 40 | .. | 84 | 24 | 75 | 10 | 54 | 4 | 63 | 14 | 106 | 97 | 120 | 126 | 113 | 112$\frac{2}{5}$ |
| 41 | Victoria Prize ...... .. | 62 | 22 | 42 | 12 | 89 | 14 | 55 | 10 | 53 | 18 | 60 | 22 | 103 | 96 | 111 | 115 | 112 | 107$\frac{2}{5}$ |
| 42 | Winter Gray ......... | 62 | 22 | 22 | 12 | 75 | 30 | 49 | 14 | 55 | 10 | 53 | 4 | 103 | 97 | 111 | 115 | 112 | 107$\frac{3}{5}$ |
| 43 | California Prolific, Blk. | 62 | 22 | 38 | 28 | 110 | .. | 71 | 6 | 58 | 28 | 68 | 10 | 109 | 98 | 117 | 126 | 117 | 113$\frac{2}{5}$ |
| 44 | Bonanza............. | 61 | 16 | 32 | 32 | 78 | 28 | 52 | 22 | 50 | .. | 55 | 6 | 103 | 100 | 104 | 115 | 113 | 107 |
| 45 | White Russian...... .. | 61 | 6 | 44 | 24 | 87 | 22 | 51 | 26 | 43 | 18 | 57 | 26 | 106 | 98 | 117 | 117 | 112 | 110 |
| 46 | Golden Tartarian..... | 61 | 6 | 35 | 30 | 98 | 28 | 67 | 32 | 61 | 28 | 65 | 4 | 110 | 105 | 117 | 133 | 115 | 116 |
| 47 | Scottish Chief....... .. | 60 | 20 | 35 | 10 | 77 | 22 | 45 | 10 | 52 | 12 | 54 | 8 | 103 | 100 | 104 | 117 | 108 | 106$\frac{2}{5}$ |
| 48 | Holstein Prolific.... .. | 60 | 10 | 27 | 22 | 93 | 18 | 65 | 20 | 60 | 22 | 61 | 18 | 105 | 101 | 120 | 117 | 116 | 111$\frac{4}{5}$ |
| 49 | Imported Irish... .... | 60 | .. | 38 | 8 | 83 | 18 | 56 | 26 | 72 | 38 | 62 | 11 | 103 | 94 | 107 | 115 | 113 | 106$\frac{2}{5}$ |
| 50 | Early Dawson . .. ... | 60 | .. | 29 | 14 | 88 | 8 | 44 | 4 | 42 | 32 | 52 | 32 | 102 | 100 | 111 | 117 | 112 | 108$\frac{2}{5}$ |
| 51 | Wide Awake ....... . | 58 | 28 | 40 | .. | 82 | 32 | 66 | 6 | 57 | 22 | 61 | 4 | 105 | 100 | 111 | 117 | 117 | 110 |
| 52 | Cream Egyptian..... | 57 | 32 | 48 | 8 | 84 | 24 | 45 | . | 57 | 12 | 58 | 22 | 103 | 96 | 111 | 115 | 113 | 107$\frac{3}{5}$ |
| 53 | Poland .............. | 57 | 22 | 35 | 30 | 74 | 4 | 67 | 12 | 45 | 25 | 56 | 5 | 103 | 94 | 111 | 115 | 113 | 107$\frac{1}{5}$ |
| 54 | White Wonder.. .... | 53 | 8 | 38 | 28 | 61 | 26 | 51 | 6 | 56 | 21 | 52 | 11 | 103 | 96 | 104 | 115 | 113 | 106$\frac{1}{5}$ |
| 55 | Siberian, O.A.C .. ... | 52 | 22 | 42 | 12 | 88 | 8 | 69 | 24 | 48 | 28 | 60 | 12 | 104 | 101 | 120 | 133 | 116 | 114$\frac{4}{5}$ |
| 56 | Black Beauty......... | 51 | 6 | ..... | | 91 | 26 | .... | | 57 | 12 | 66 | 26 | 104 | .... | 117 | .... | 112 | 111 |
| 57 | Cromwell...... ..... | 50 | 20 | 32 | 10 | 93 | 18 | 48 | 28 | 62 | 32 | 57 | 22 | 107 | 103 | 118 | 133 | 114 | 115 |
| 58 | Rosedale........... . | 50 | 10 | 33 | 18 | 82 | 32 | 76 | 26 | 53 | 8 | 59 | 12 | 106 | 98 | 111 | 124 | 114 | 110$\frac{3}{5}$ |
| 59 | Welcome.......... ... | 50 | .. | 35 | 10 | 92 | 32 | 52 | 2 | 46 | 28 | 55 | 14 | 104 | 98 | 111 | 115 | 115 | 108$\frac{3}{5}$ |
| 60 | Prize Cluster .... .... | 47 | 2 | 47 | 22 | 78 | 28 | 53 | 18 | 42 | 12 | 53 | 30 | 104 | 94 | 111 | 115 | 116 | 108 |
| 61 | Medal............. . | 47 | 2 | 26 | 16 | 77 | 2 | 58 | 28 | 51 | 6 | 52 | 4 | 106 | 101 | 120 | 133 | 115 | 115 |
| 62 | Rennie's Prize..... . | 46 | 26 | 40 | .. | 65 | 10 | 52 | 12 | 52 | 32 | 51 | 16 | 103 | 94 | 116 | 115 | 113 | 108$\frac{1}{5}$ |
| 63 | Abyssinia. ..... .... | 46 | 26 | 45 | 30 | 92 | 32 | 75 | 30 | 52 | 22 | 62 | 28 | 105 | 96 | 118 | 127 | 116 | 112$\frac{2}{5}$ |
| 64 | Prolific Black Tartarian | 43 | 28 | 36 | 16 | 94 | 24 | 63 | 28 | 61 | 18 | 60 | 2 | 109 | 96 | 117 | 117 | 114 | 110$\frac{3}{5}$ |
| 65 | Danish Island........ | 42 | 12 | 39 | 14 | 99 | 14 | 57 | 2 | 85 | 10 | 64 | 24 | 100 | 100 | 117 | 123 | 117 | 111$\frac{2}{5}$ |

The twelve varieties of oats which have produced the largest crops during 1898, at the several Experimental Farms are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Hazlett's Seizure............. | 89 | 14 | 7. Early Golden Prolific....... | 79 | 14 |
| 2. Joanette........ ........... | 86 | 16 | 8. Improved Ligowo .......... | 78 | 32 |
| 3. Brandon . . . ........... ... | 80 | 30 | 9. Holland............... ..... | 78 | 18 |
| 4. Oderbruch............ ..... . | 80 | 30 | 10. Russell.......... .. ...... | 78 | 8 |
| 5. Golden Beauty. ............. | 80 | 20 | 11. King .... .................. | 77 | 23 |
| 6. Black Mesdag.. ............ | 80 | .. | 12. Abundance.... ............ | 76 | 26 |

An average crop for the twelve sorts of 80 bushels 22 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Thousand Dollar | 50 | .. | 7. Oderbruch | 47 | 2 |
| 2. Cream Egyptian | 48 | 8 | 8. Abyssinia | 45 | 30 |
| 3. Abundance | 48 | 8 | 9. White Schonen | 45 | 10 |
| 4. Columbus | 48 | 8 | 10. Banner | 44 | 24 |
| 5. Lincoln | 48 | 8 | 11. Bavarian | 44 | 24 |
| 6. Prize Cluster | 47 | 22 | 12. White Russian | 44 | 24 |

An average crop of 46 bushels 31 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Giant | 114 | 4 | 7. Pense | 106 | 16 |
| 2. American Beauty | 113 | 18 | 8. Banner | 106 | 6 |
| 3. California Prolific Black | 110 | — | 9. American Triumph | 105 | 30 |
| 4. Bavarian | 109 | 14 | 10. Thousand Dollar | 104 | 4 |
| 5. Mennonite | 108 | 28 | 11. White Schonen | 104 | 4 |
| 6. Oxford | 106 | 16 | 12. Newmarket | 99 | 14 |

An average crop of 107 bushels 13 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Buckbee's Illinois | 79 | 14 | 7. Oderbruch | 75 | — |
| 2. Rosedale | 76 | 26 | 8. Improved American | 72 | 22 |
| 3. Columbus | 76 | 16 | 9. Banner | 72 | 2 |
| 4. Abyssinia | 75 | 30 | 10. Early Blossom | 71 | 26 |
| 5. Early Maine | 75 | 10 | 11. Bavarian | 71 | 26 |
| 6. American Beauty | 75 | — | 12. California Prolific Black | 71 | 6 |

An average crop of 74 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Island | 85 | 10 | 7. White Giant | 61 | 18 |
| 2. Imported Irish | 72 | 38 | 8. Prolific Blk. Tartarian. | 61 | 18 |
| 3. Bavarian | 66 | 16 | 9. Holstein Prolific | 60 | 22 |
| 4. American Triumph | 64 | 4 | 10. Golden Beauty | 59 | 14 |
| 5. Cromwell | 62 | 32 | 11. Lincoln | 59 | 4 |
| 6. Golden Tartarian | 61 | 28 | 12. California Prolific Black | 58 | 28 |

An average crop of 62 bushels 2 lbs. per acre.

The twelve varieties which have produced the largest crops in 1898 taking the average results obtained on all the experimental farms are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Bavarian | 72 | 23 | 7. American Beauty | 68 | 26 |
| 2. Banner | 71 | 12 | 8. California Prolific Black | 68 | 10 |
| 3. White Giant | 70 | 26 | 9. Abundance | 67 | 20 |
| 4. Oderbruch | 69 | 15 | 10. White Schonen | 67 | 7 |
| 5. Columbus | 69 | 5 | 11. Mennonite | 67 | — |
| 6. American Triumph | 68 | 30 | 12 Golden Beauty | 66 | 30 |

An average crop of 69 bushels per acre.

The average crop of all the varieties of oats tested at each of the Experimental Farms in 1898 was as follows :—At Ottawa, 66 bushels 11 lbs. per acre ; Nappan, 37 bushels ; Brandon, 90 bushels 8 lbs ; Indian Head, 61 bushels 30 lbs., and at Agassiz, 52 bushels 29 lbs. The average return given by the whole of the varieties tested at all the farms was 61 bushels 22 lbs. per acre.

## TRIAL PLOTS OF BARLEY.

Forty-one varieties of barley have been included in the trial plots during 1898, eighteen different sorts of two-rowed barley and twenty-three of six-rowed. Among the two-rowed sorts are included eleven hybrid varieties which have been produced at the Experimental Farms namely :—Beaver, Dunham, Leslie, Bolton, Victor, Nepean, Logan, Sidney, Pacer, Kirby and Monck. Among the six-rowed sorts there are twelve of these hybrids, namely :—Pioneer, Royal, Mansfield, Empire, Argyle, Stella, Phœnix, Surprise, Nugent, Summit, Trooper and Vanguard.

The barley plots were of the same size as those sown with oats. The quantity of seed used in each case was at the rate of two bushels per acre, and the dates of sowing were as follows :—At Ottawa, 16th to 18th April ; Nappan, 10th May ; Brandon, 13th May ; Indian Head, 4th May, and at Agassiz, on the 21st of April.

### Uniform Test Plots of Two-rowed Barley.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1898. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Beaver | 55 | 20 | 40 | 40 | 57 | 44 | 37 | 4 | 39 | 8 | 46 | 4 | 101 | 94 | 102 | 121 | 103 | 104⅕ |
| 2 | Danish Chevalier | 50 | .. | 33 | 16 | 37 | 4 | 57 | 44 | 33 | 16 | 42 | 16 | 101 | 97 | 107 | 121 | 106 | 106⅖ |
| 3 | Canadian Thorpe | 47 | 14 | 27 | 24 | 45 | 20 | 50 | 10 | 27 | 44 | 39 | 32 | 103 | 94 | 107 | 125 | 106 | 107 |
| 4 | Dunham | 46 | 2 | 32 | 24 | 62 | 24 | 43 | 36 | 29 | 8 | 42 | 38 | 103 | 94 | 105 | 120 | 103 | 105 |
| 5 | Leslie | 45 | 40 | 26 | 32 | 57 | 44 | 40 | .. | 30 | .. | 40 | 4 | 103 | 94 | 104 | 115 | 103 | 103⅘ |
| 6 | Prize Prolific | 43 | 16 | 27 | 24 | 46 | 12 | 53 | 36 | 36 | 12 | 41 | 20 | 101 | 97 | 105 | 124 | 106 | 106⅗ |
| 7 | Bolton | 43 | 6 | 35 | .. | 45 | 40 | 41 | 12 | 31 | 12 | 39 | 14 | 98 | 94 | 99 | 120 | 103 | 102⅘ |
| 8 | Victor | 39 | 8 | 29 | 8 | 46 | 32 | 37 | 24 | 29 | 8 | 36 | 16 | 98 | 94 | 99 | 120 | 103 | 102⅘ |
| 9 | Kinver Chevalier | 38 | 16 | 25 | 40 | 49 | 28 | 53 | 16 | 40 | .. | 41 | 20 | 101 | 97 | 113 | 124 | 106 | 108⅕ |
| 10 | Thanet | 38 | 6 | 24 | 8 | 56 | 32 | 54 | 18 | 22 | 44 | 39 | 12 | 101 | 97 | 107 | 124 | 106 | 107 |
| 11 | Nepean | 37 | 34 | 28 | 16 | 55 | 20 | 41 | 32 | 25 | .. | 37 | 30 | 99 | 94 | 101 | 121 | 103 | 103⅗ |
| 12 | French Chevalier | 36 | 42 | 30 | .. | 57 | 44 | 53 | 6 | 31 | 32 | 41 | 44 | 101 | 97 | 107 | 121 | 106 | 106⅖ |
| 13 | Newton | 36 | 32 | 33 | 16 | 53 | 36 | 53 | 26 | 33 | 16 | 42 | 6 | 103 | 94 | 107 | 119 | 103 | 105⅕ |
| 14 | Logan | 35 | 20 | 25 | 40 | 54 | 8 | 39 | 28 | 29 | 8 | 36 | 40 | 100 | 94 | 104 | 115 | 103 | 103⅕ |
| 15 | Sidney | 33 | 36 | 32 | 24 | 47 | 24 | 50 | .. | 30 | 40 | 38 | 44 | 98 | 97 | 99 | 121 | 104 | 103⅘ |
| 16 | Pacer | 33 | 6 | 25 | 40 | 45 | 40 | 35 | 30 | 34 | 8 | 34 | 44 | 101 | 94 | 101 | 121 | 103 | 104 |
| 17 | Kirby | 31 | 10 | 28 | 16 | 65 | 20 | 44 | 28 | 25 | 40 | 39 | 3 | 100 | 94 | 103 | 115 | 103 | 103 |
| 18 | Monck | 27 | 34 | 25 | .. | 45 | 20 | 36 | 22 | 25 | 40 | 32 | 14 | 103 | 97 | 103 | 121 | 106 | 106 |

The six varieties of two-rowed barley, which have given the largest crops at the several experimental farms during 1898, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver | 55 | 20 | 4. Dunham | 46 | 2 |
| 2. Danish Chevalier | 50 | .. | 5. Leslie | 45 | 40 |
| 3. Canadian Thorpe | 47 | 14 | 6. Prize Prolific | 43 | 16 |

An average crop of 47 bushels 47 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver | 40 | 40 | 4. Danish Chevalier | 33 | 16 |
| 2. Bolton | 35 | .. | 5. Dunham | 32 | 24 |
| 3. Newton | 33 | 16 | 6. Sidney | 32 | 24 |

An average crop of 34 bushels 28 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Kirby | 65 | 20 | 4. Beaver | 57 | 44 |
| 2. Dunham | 62 | 24 | 5. Leslie | 57 | 4 |
| 3. French Chevalier | 57 | 44 | 6. Thanet | 56 | 32 |

An average crop of 59 bushels 28 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Chevalier | 57 | 44 | 4. Newton | 53 | 26 |
| 2. Thanet | 54 | 18 | 5. Kinver Chevalier | 53 | 16 |
| 3. Prize Prolific | 53 | 36 | 6. French Chevalier | 53 | 6 |

An average crop of 54 bushels 16 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Kinver Chevalier | 40 | .. | 4. Pacer | 34 | 8 |
| 2. Beaver | 39 | 8 | 5. Danish Chevalier | 33 | 16 |
| 3. Prize Prolific | 36 | 12 | 6. Newton | 33 | 16 |

An average crop of 36 bushels 2 lbs. per acre.

The six varieties of two-rowed barley, which have given the largest crops in 1898, taking the average of the results obtained on all the experimental farms are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver | 46 | 4 | 4. Newton | 42 | 6 |
| 2. Dunham | 42 | 38 | 5. French Chevalier | 41 | 44 |
| 3. Danish Chevalier | 42 | 16 | 6. Prize Prolific | 41 | 20 |

An average crop of 42 bushels 29 lbs. per acre.

The average crop of all the varieties of two-rowed barley tested at each of the experimental farms in 1898, was as follows :—At Ottawa, 39 bushels 46 lbs. per acre; at Nappan, 29 bushels 23 lbs.; Brandon, 51 bushels 35 lbs.; Indian Head, 45 bushels 37 lbs., and at Agassiz, 30 bushels 40 lbs.

The average return given by the whole of the varieties at all the farms was 39 bushels 26 lbs. per acre.

UNIFORM TESTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1898. Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Number of Days from Sowing to Harvesting. Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Odessa | 58 | 16 | 40 | 40 | 53 | 36 | 53 | 6 | 34 | 8 | 48 | 2 | 97 | 90 | 96 | 104 | 102 | 97 4/5 |
| 2 | Pioneer | 57 | 4 | 50 | .. | 63 | 16 | 47 | 24 | 35 | 20 | 50 | 32 | 101 | 91 | 98 | 115 | 100 | 101 |
| 3 | Mensury | 55 | .. | 37 | 24 | 55 | 40 | 47 | 24 | 37 | 24 | 46 | 34 | 100 | 88 | 94 | 107 | 100 | 97 4/5 |
| 4 | Royal | 52 | 34 | 33 | 16 | 55 | 20 | 45 | 30 | 38 | 16 | 45 | 4 | 97 | 90 | 94 | 107 | 100 | 97 3/5 |
| 5 | Mansfield | 51 | 32 | 33 | 16 | 60 | 40 | 43 | 16 | 34 | 28 | 44 | 36 | 100 | 93 | 95 | 115 | 102 | 101 |
| 6 | Blue Barley | 50 | 6 | 33 | 16 | 35 | 20 | 42 | 24 | 26 | 32 | 37 | 29 | 103 | 91 | 97 | 101 | 103 | 99 |
| 7 | Empire | 49 | 28 | 34 | 8 | 55 | 20 | 37 | 24 | 36 | 12 | 42 | 28 | 100 | 94 | 98 | 115 | 102 | 101 4/5 |
| 8 | Argyle | 49 | 8 | 32 | 24 | 62 | 24 | 47 | 44 | 36 | 32 | 45 | 36 | 95 | 91 | 98 | 115 | 102 | 100 1/5 |
| 9 | Stella | 47 | 4 | 46 | 32 | 68 | 16 | 47 | 14 | 34 | 8 | 48 | 34 | 100 | 97 | 103 | 114 | 103 | 103 2/5 |
| 10 | Oderbruch | 46 | 42 | 45 | 40 | 62 | 4 | 44 | 38 | 29 | 28 | 45 | 40 | 96 | 90 | 94 | 107 | 100 | 97 2/5 |
| 11 | Phœnix | 45 | .. | 34 | 8 | 55 | 20 | 50 | 20 | 40 | .. | 45 | .. | 96 | 91 | 94 | 107 | 102 | 98 |
| 12 | Surprise | 44 | 38 | 29 | 8 | 58 | 16 | 37 | 24 | 25 | .. | 38 | 46 | 100 | 97 | 103 | 114 | 103 | 103 2/5 |
| 13 | Nugent | 41 | 22 | 34 | 8 | 51 | 32 | 47 | 24 | 28 | 16 | 40 | 30 | 100 | 91 | 98 | 112 | 102 | 100 3/5 |
| 14 | Rennie's Improved | 41 | 12 | 34 | 8 | 59 | 8 | 56 | 32 | 27 | 44 | 43 | 40 | 91 | 90 | 94 | 107 | 102 | 96 4/5 |
| 15 | Summit | 40 | 20 | 36 | 32 | 57 | 24 | 46 | 2 | 35 | 40 | 43 | 14 | 100 | 97 | 98 | 114 | 103 | 102 2/5 |
| 16 | Common | 40 | 20 | 37 | 24 | 62 | 44 | 48 | 46 | 34 | 8 | 44 | 38 | 101 | 90 | 95 | 111 | 104 | 100 1/5 |
| 17 | Trooper | 38 | 36 | 40 | 40 | 62 | 44 | 51 | 22 | 35 | .. | 45 | 38 | 97 | 91 | 102 | 115 | 102 | 101 2/5 |
| 18 | Success | 37 | 24 | 36 | 32 | 44 | 8 | 42 | 4 | 32 | 44 | 38 | 28 | 87 | 88 | 95 | 96 | 97 | 92 3/5 |
| 19 | Petschora | 37 | 24 | 29 | 8 | 54 | 8 | 54 | 38 | 28 | 36 | 40 | 42 | 96 | 91 | 94 | 107 | 100 | 97 3/5 |
| 20 | Vanguard | 36 | 32 | 38 | 16 | 46 | 32 | 30 | 20 | 31 | 32 | 36 | 36 | 91 | 90 | 94 | 104 | 100 | 95 4/5 |
| 21 | Excelsior | 36 | 2 | 33 | 16 | 46 | 12 | 46 | 12 | 34 | 28 | 39 | 14 | 96 | 88 | 93 | 101 | 97 | 95 |
| 22 | Baxter | 35 | .. | 41 | 32 | 63 | 36 | 52 | 14 | 34 | 28 | 45 | 22 | 97 | 88 | 95 | 107 | 100 | 97 2/5 |
| 23 | Champion | 33 | 16 | 25 | .. | 37 | 24 | 46 | 22 | 35 | 20 | 35 | 26 | 96 | 88 | 92 | 103 | 97 | 95 1/5 |

The six varieties of six-rowed barley, which have given the largest crops at the several experimental farms during 1898, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 58 | 16 | 4. Royal | 52 | 34 |
| 2. Pioneer | 57 | 4 | 5. Mansfield | 51 | 32 |
| 3. Mensury | 55 | .. | 6. Blue barley | 50 | 6 |

An average crop of 54 bushels 7 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pioneer | 50 | .. | 4. Odessa | 41 | 32 |
| 2. Stella | 46 | 32 | 5. Trooper | 40 | 40 |
| 3. Oderbruch | 45 | 40 | 6. Vanguard | 40 | 40 |

An average crop of 44 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Stella | 68 | 16 | 4. Trooper | 62 | 44 |
| 2. Baxter | 63 | 36 | 5. Common | 62 | 44 |
| 3. Pioneer | 63 | 16 | 6. Argyle | 62 | 24 |

An average crop of 63 bushels 46 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rennie's Improved | 56 | 32 | 4. Baxter | 52 | 14 |
| 2. Petschora | 54 | 38 | 5. Trooper | 51 | 22 |
| 3. Odessa | 53 | 6 | 6. Phœnix | 50 | 20 |

An average crop of 53 bushels 6 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Phœnix | 40 | .. | 4. Argyle | 36 | 32 |
| 2. Royal | 38 | 16 | 5. Empire | 36 | 12 |
| 3. Mensury | 37 | 24 | 6. Summit | 35 | 40 |

An average crop of 37 bushels 21 lbs. per acre.

The six varieties of six-rowed barley, which have given the largest crops in 1898, taking the average of the results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pioneer | 50 | 32 | 4. Mensury | 46 | 34 |
| 2. Stella | 48 | 34 | 5. Oderbruch | 45 | 40 |
| 3. Odessa | 48 | 2 | 6. Trooper | 45 | 38 |

An average crop of 47 bushels 30 lbs. per acre.

The average crop of all the varieties of six-rowed barley, tested at each of the experimental farms in 1898, was as follows : At Ottawa, 44 bushels 28 lbs. per acre ; Nappan, 36 bushels 21 lbs. ; Brandon, 55 bushels 17 lbs. ; Indian Head, 46 bushels 20 lbs., and at Agassiz, 33 bushels 17 lbs. The average return given by the whole of the varieties, at all the farms, was 43 bushels 11 lbs. per acre.

## TRIAL PLOTS OF SPRING WHEAT.

The uniform test plots of spring wheat for 1898, have included forty-two varieties. There were among these, twenty-one cross-bred sorts, which have been produced at the experimental farms. These are Plumper, Blair, Preston, Rideau, Vernon, Stanley, Percy, Countess, Huron, Progress, Harold, Captor, Crown, Blenheim, Mason, Dawn, Advance, Dufferin, Alpha, Admiral and Beauty. The size of the plots in each case, was the same as those of the oats, and the quantity of seed sown, was in the proportion of one and one-half bushel per acre. The dates of sowing were as follows : At Ottawa, 20th to 22nd April ; Nappan, 9th May ; Brandon, 20th April ; Indian Head, 21st April, and at Agassiz, 15th April.

## Uniform Test Plots of Spring Wheat.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1898. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Plumper | 31 | 15 | 18 | 40 | 20 | .. | 21 | 40 | 28 | 20 | 23 | 59 | 100 | 102 | 117 | 125 | 113 | $111\frac{2}{5}$ |
| 2 | Rio Grande | 30 | 50 | 20 | .. | 30 | .. | 36 | 20 | 27 | 30 | 28 | 56 | 104 | 107 | 127 | 128 | 116 | $116\frac{2}{5}$ |
| 3 | Emporium | 30 | 40 | 21 | 20 | 26 | 20 | 38 | 50 | 25 | 30 | 28 | 32 | 104 | 106 | 127 | 127 | 115 | $115\frac{4}{5}$ |
| 4 | Wellman's Fife | 30 | .. | 25 | 20 | 37 | .. | 43 | 10 | 28 | . | 32 | 42 | 106 | 107 | 125 | 133 | 116 | $117\frac{2}{5}$ |
| 5 | Blair | 29 | 30 | 15 | 20 | 24 | 40 | 30 | . | 26 | 20 | 25 | 10 | 103 | 102 | 131 | 125 | 113 | $114\frac{4}{5}$ |
| 6 | Preston | 28 | 50 | 17 | 20 | 32 | 20 | 42 | 10 | 28 | 40 | 29 | 52 | 100 | 101 | 125 | 127 | 115 | $113\frac{3}{5}$ |
| 7 | Colorado | 28 | 20 | 20 | 40 | 26 | 40 | 27 | .. | 28 | .. | 26 | 8 | 101 | 101 | 125 | 127 | 115 | $113\frac{4}{5}$ |
| 8 | Goose | 28 | 10 | 17 | 20 | 45 | 20 | 34 | 20 | 26 | 40 | 30 | 22 | 103 | 102 | 128 | 127 | 119 | $115\frac{4}{5}$ |
| 9 | Rideau | 27 | 20 | 18 | 40 | 24 | 40 | 34 | .. | 27 | 45 | 26 | 5 | 101 | 102 | 124 | 127 | 112 | $113\frac{1}{5}$ |
| 10 | Beaudry | 27 | 20 | 19 | 20 | 25 | .. | 35 | 50 | 29 | .. | 27 | 18 | 99 | 102 | 122 | 127 | 115 | 113 |
| 11 | Vernon | 27 | 10 | 17 | 20 | 31 | .. | 34 | 30 | 28 | 40 | 27 | 44 | 101 | 102 | 125 | 136 | 115 | $115\frac{4}{5}$ |
| 12 | Red Fern | 27 | 10 | 18 | .. | 31 | .. | 36 | 20 | 26 | .. | 27 | 42 | 104 | 101 | 124 | 136 | 116 | $116\frac{1}{5}$ |
| 13 | Black Sea | 27 | 10 | 14 | 40 | 21 | .. | 36 | 40 | 29 | 40 | 25 | 50 | 102 | 101 | 125 | 124 | 113 | 113 |
| 14 | Stanley | 26 | 50 | 17 | 20 | 33 | 40 | 43 | 10 | 23 | 30 | 28 | 54 | 101 | 107 | 126 | 124 | 113 | $114\frac{1}{5}$ |
| 15 | Percy | 26 | 40 | 17 | 20 | 33 | 40 | 45 | 20 | 23 | 30 | 29 | 18 | 99 | 105 | 120 | 124 | 113 | $112\frac{1}{5}$ |
| 16 | Dion's | 26 | 40 | 15 | 20 | 27 | 20 | 39 | 40 | 27 | .. | 27 | 12 | 104 | 105 | 124 | 136 | 119 | $117\frac{3}{5}$ |
| 17 | Pringle's Champlain | 26 | .. | 24 | 40 | 32 | .. | 31 | 50 | 26 | .. | 28 | 6 | 99 | 101 | 126 | 124 | 115 | 113 |
| 18 | Countess | 25 | 30 | 20 | 40 | 25 | 40 | 32 | 40 | 27 | 50 | 26 | 28 | 102 | 102 | 124 | 124 | 112 | $112\frac{4}{5}$ |
| 19 | Monarch | 25 | 20 | 20 | .. | 42 | 40 | 43 | 20 | 29 | 20 | 32 | 8 | 104 | 108 | 126 | 127 | 119 | $116\frac{4}{5}$ |
| 20 | Huron | 24 | 10 | 21 | 20 | 33 | 40 | 32 | 30 | 30 | .. | 28 | 20 | 104 | 106 | 125 | 126 | 115 | $115\frac{1}{5}$ |
| 21 | Progress | 24 | .. | 22 | 40 | 32 | .. | 40 | 20 | 29 | .. | 29 | 36 | 102 | 102 | 120 | 124 | 115 | $112\frac{3}{5}$ |
| 22 | White Chaff, Campbell's | 23 | 40 | 16 | .. | 31 | 20 | 39 | 40 | 27 | .. | 27 | 31 | 101 | 102 | 125 | 126 | 115 | $113\frac{4}{5}$ |
| 23 | Harold | 23 | .. | 18 | 40 | 18 | 40 | 26 | 40 | 23 | 40 | 22 | 8 | 95 | 102 | 120 | 117 | 106 | 108 |
| 24 | Golden Drop | 22 | 40 | 16 | .. | 29 | 20 | 33 | 30 | 27 | 20 | 25 | 46 | 103 | 101 | 125 | 126 | 113 | $113\frac{3}{5}$ |
| 25 | Captor | 22 | 22 | 18 | .. | 22 | 20 | 42 | 30 | 24 | .. | 25 | 50 | 102 | 106 | 130 | 127 | 113 | $115\frac{3}{5}$ |
| 26 | Hungarian | 22 | 20 | 22 | .. | 35 | | 34 | 40 | 27 | 40 | 28 | 20 | 104 | 106 | 125 | 124 | 113 | $112\frac{2}{5}$ |
| 27 | Crown | 22 | .. | 16 | .. | 38 | 20 | 41 | 20 | 23 | .. | 28 | 8 | 104 | 107 | 125 | 126 | 113 | 115 |
| 28 | Herisson Bearded | 21 | 40 | 20 | .. | 27 | .. | 28 | 50 | 25 | 10 | 24 | 32 | 106 | 102 | 126 | 127 | 115 | $115\frac{1}{5}$ |
| 29 | White Fife | 21 | 30 | 17 | 20 | 40 | .. | 45 | 30 | 26 | 10 | 30 | 6 | 106 | 105 | 126 | 133 | 116 | $117\frac{1}{5}$ |
| 30 | White Connell | 21 | 30 | 22 | .. | 37 | 20 | 42 | 30 | 31 | 20 | 30 | 56 | 107 | 106 | 126 | 133 | 116 | $117\frac{3}{5}$ |
| 31 | Red Fife | 21 | 20 | 19 | 20 | 36 | 20 | 44 | 20 | 28 | 20 | 29 | 56 | 110 | 106 | 127 | 133 | 115 | $118\frac{1}{5}$ |
| 32 | Blenheim | 21 | .. | 20 | .. | 30 | .. | 37 | 20 | 27 | 35 | 27 | 11 | 107 | 106 | 126 | 127 | 119 | 117 |
| 33 | Mason | 20 | 45 | 12 | 40 | 20 | .. | 27 | 20 | 25 | .. | 21 | 9 | 103 | 102 | 125 | 120 | 112 | $112\frac{2}{5}$ |
| 34 | Dawn | 20 | .. | 14 | . | 25 | 40 | 35 | 30 | 25 | 40 | 24 | 10 | 106 | 101 | 120 | 124 | 108 | $111\frac{4}{5}$ |
| 35 | Advance | 18 | 40 | 17 | 20 | 23 | 40 | 38 | 40 | 25 | 10 | 24 | 42 | 106 | 107 | 126 | 127 | 116 | $116\frac{1}{5}$ |
| 36 | Dufferin | 17 | 15 | 16 | 40 | 34 | .. | 35 | .. | 26 | 20 | 25 | 51 | 106 | 101 | 122 | 127 | 112 | $113\frac{3}{5}$ |
| 37 | Ladoga | 17 | .. | 15 | 20 | 20 | 20 | 23 | 40 | 27 | 10 | 20 | 42 | 103 | 101 | 124 | 125 | 113 | $113\frac{1}{5}$ |
| 38 | Alpha | 16 | 30 | 22 | 40 | 27 | 20 | 31 | .. | 27 | 35 | 25 | 1 | 107 | 105 | 126 | 124 | 115 | $115\frac{2}{5}$ |
| 39 | Old Red River | 16 | 10 | 18 | 40 | 33 | .. | 36 | 10 | 27 | 40 | 26 | 20 | 106 | 107 | 126 | 126 | 119 | $116\frac{4}{5}$ |
| 40 | Admiral | 15 | 20 | 22 | .. | 31 | .. | 34 | 20 | 28 | .. | 26 | 8 | 103 | 105 | 126 | 126 | 115 | 115 |
| 41 | Beauty | 15 | 20 | 23 | 20 | 30 | 20 | 38 | 40 | 25 | 40 | 26 | 40 | 107 | 106 | 125 | 126 | 115 | $115\frac{4}{5}$ |
| 42 | White Russian | 15 | .. | 13 | 20 | 33 | 40 | 42 | 30 | 28 | 30 | 26 | 12 | 104 | 102 | 125 | 134 | 116 | $116\frac{1}{5}$ |

The twelve varieties of spring wheat which have given the largest crops at the several experimental farms during 1898, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Laurel | 32 | 30 | 7. Preston | 28 | 50 |
| 2. Plumper | 31 | 15 | 8. Colorado | 28 | 20 |
| 3. Rio Grande | 30 | 50 | 9. Goose | 28 | 10 |
| 4. Emporium | 30 | 40 | 10. Fraser | 28 | 10 |
| 5. Wellman's Fife | 30 | .. | 11. Rideau | 27 | 20 |
| 6. Blair | 29 | 30 | 12 Beaudry | 27 | 20 |

An average crop of 29 bushels 19 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Wellman's Fife | 25 | 20 | 7. Hungarian | 22 | .. |
| 2. Pringle's Champlain | 24 | 40 | 8. White Connell | 22 | .. |
| 3. Beauty | 23 | 20 | 9. Emporium | 21 | 20 |
| 4. Progress | 22 | 40 | 10. Huron | 21 | 20 |
| 5. Alpha | 22 | 40 | 11. Countess | 20 | 40 |
| 6. Admiral | 22 | .. | 12. Colorado | 20 | 40 |

An average crop of 22 bushels 23 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Goose | 45 | 20 | 7. Red Fife | 36 | 20 |
| 2. Monarch | 42 | 40 | 8. Hungarian | 35 | .. |
| 3. White Fife | 40 | .. | 9. Dufferin | 34 | .. |
| 4. Crown | 38 | 20 | 10. Percy | 33 | 40 |
| 5. White Connell | 37 | 20 | 11. Stanley | 33 | 40 |
| 6. Wellman's Fife | 37 | .. | 12. Huron | 33 | 40 |

An average crop of 37 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. White Fife | 45 | 30 | 7. Captor | 42 | 30 |
| 2. Percy | 45 | 20 | 8. White Connell | 42 | 30 |
| 3. Red Fife | 44 | 20 | 9. White Russian | 42 | 20 |
| 4. Monarch | 43 | 20 | 10. Preston | 42 | 10 |
| 5. Stanley | 43 | 10 | 11. Crown | 41 | 20 |
| 6. Wellman's Fife | 43 | 10 | 12. Progress | 40 | 20 |

An average crop of 43 bushels per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. White Connell | 31 | 20 | 7. Preston | 28 | 40 |
| 2. Huron | 30 | .. | 8. Vernon | 28 | 40 |
| 3. Black Sea | 29 | 40 | 9. White Russian | 28 | 30 |
| 4. Monarch | 29 | 20 | 10. Plumper | 28 | 20 |
| 5. Progress | 29 | .. | 11. Red Fife | 28 | 20 |
| 6. Beaudry | 29 | .. | 12. Wellman's Fife | 28 | .. |

An average crop of 29 bushels 4 lbs. per acre.

The twelve varieties of spring wheat which have given the largest crops, in 1898, taking the average of the results obtained on all the experimental farms are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wellman's Fife | 32 | 42 | 7. Preston | 29 | 52 |
| 2. Monarch | 32 | 8 | 8. Progress | 29 | 36 |
| 3. White Connell | 30 | 56 | 9. Percy | 29 | 18 |
| 4. Goose | 30 | 22 | 10. Rio Grande | 28 | 56 |
| 5. White Fife | 30 | 6 | 11. Stanley | 28 | 54 |
| 6. Red Fife | 29 | 56 | 12. Emporium | 28 | 32 |

An average crop of 30 bushels 6 lbs. per acre.

The average crop of all the varieties of spring wheat tested at each of the experimental farms in 1898, was as follows : at Ottawa, 23 bushels 39 lbs. per acre ; Nappan, 18 bushels 40 lbs. ; Brandon, 30 bushels ; Indian Head, 36 bushels 10 lbs. and at Agassiz 27 bushels. The average return given by the whole of the varieties of spring wheat at all the farms was 27 bushels 6 lbs. per acre.

## TRIAL PLOTS OF PEASE.

Forty-seven varieties of pease have been tested in the uniform trial plots during the past season. Among these there were twenty-five of the cross-bred sorts which have been originated at the experimental farms. These are, Arthur, Macoun, Picton, Perth, Lanark, Archer, Vincent, Mackay, Bright, Bedford, Nelson, Fergus, Carleton, Cooper, Duke, Bruce, Victoria, Agnes, Gregory, Fenton, Alma, King, Kent, Trilby and Prince. These were sown in plots of one-tenth acre each at Brandon and Indian Head and one-fortieth acre each at Ottawa, and Agassiz, and the quantity of seed used per acre has varied from two to three bushels, depending on the size of the pea. The dates of sowing were as follows : At Ottawa, 18th to 20th April ; Brandon, 24th to 29th April ; Indian Head, 5th and 6th May, and at Agassiz, 14th April.

No returns are given of the plots of pease at Nappan for the reason that the seed was unfortunatety sown on a piece of land which was afterwards found to be very badly infested with a weed known as spurrey, *Spergula arvensis* L. This weed came up so thickly and grew so rapidly that the pease were nearly smothered and on this account a large proportion of them were cut green and fed to cattle.

This crop was also subject to an unfortunate accident at Ottawa. On the 5th of August when the varieties numbered in the list from 37 to 48 inclusive were cut and drying in the field a violent storm of wind suddenly arose which carried them all to the other end of the field and the different sorts were so mixed that it was impossible to separate them. On this account the crop of these varieties can only be given for three of the farms.

## Uniform Test Plots of Pease.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, for Season of 1898. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Brandon, Man. Bush. | Brandon, Man. Lbs. | Indian Head, N.W.T. Bush. | Indian Head, N.W.T. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of four Farms. Bush. | Average of four Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Brandon, Man. Days. | Indian Head, N.W.T. Days. | Agassiz, B.C. Days. | Average of four Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Arthur | 46 | 50 | 46 | .. | 28 | 50 | 31 | .. | 38 | 10 | 102 | 127 | 127 | 111 | 116¾ |
| 2 | Elephant Blue | 45 | 20 | 39 | .. | 43 | 10 | 36 | .. | 40 | 52 | 105 | 120 | 125 | 113 | 115¾ |
| 3 | Macoun | 40 | .. | 39 | .. | 28 | 20 | 36 | 20 | 35 | 55 | 112 | 131 | 128 | 116 | 121¾ |
| 4 | Picton | 40 | .. | 43 | 40 | 36 | 40 | 34 | 20 | 38 | 40 | 105 | 123 | 131 | 115 | 118½ |
| 5 | Pride | 40 | .. | 54 | 40 | 44 | 50 | 32 | 40 | 43 | 2 | 101 | 120 | 124 | 112 | 114¼ |
| 6 | Prussian Blue | 40 | .. | 42 | .. | 35 | 20 | 30 | .. | 36 | 50 | 106 | 124 | 125 | 112 | 116¾ |
| 7 | Perth | 39 | 30 | 55 | 40 | 49 | 30 | 28 | .. | 43 | 12 | 104 | 127 | 120 | 113 | 116 |
| 8 | Crown | 39 | 10 | 28 | 40 | 45 | 30 | 35 | .. | 37 | 5 | 101 | 111 | 122 | 110 | 111 |
| 9 | Multiplier | 38 | 40 | 39 | .. | 29 | 40 | 34 | .. | 35 | 20 | 108 | 130 | 129 | 117 | 121 |
| 10 | Lanark | 38 | 30 | 45 | .. | 31 | 40 | 32 | 20 | 36 | 52 | 104 | 125 | 123 | 111 | 115¾ |
| 11 | Black-eyed Marrowfat | 38 | 20 | 48 | .. | 33 | 10 | 25 | .. | 36 | 7 | 105 | 128 | 129 | 113 | 118¾ |
| 12 | Centennial | 38 | .. | 31 | 20 | 36 | 20 | 32 | .. | 34 | 25 | 105 | 124 | 129 | 115 | 118¼ |
| 13 | Archer | 38 | .. | 39 | .. | 38 | 50 | 29 | 10 | 36 | 15 | 108 | 130 | 127 | 113 | 119½ |
| 14 | Large White Marrowfat | 37 | 30 | 39 | 20 | 35 | .. | 28 | .. | 34 | 57 | 111 | 133 | 129 | 115 | 122 |
| 15 | Vincent | 37 | 20 | 49 | .. | 40 | .. | 32 | 10 | 39 | 37 | 107 | 123 | 124 | 110 | 116 |
| 16 | Oddfellow | 36 | 40 | 24 | .. | 37 | 30 | 26 | 20 | 31 | 7 | 106 | 118 | 123 | 111 | 114½ |
| 17 | German White | 35 | 50 | 47 | 20 | 37 | 40 | 33 | 20 | 38 | 32 | 101 | 123 | 116 | 110 | 112½ |
| 18 | Mackay | 35 | 40 | 39 | .. | 38 | 20 | 27 | 40 | 35 | 10 | 107 | 132 | 123 | 115 | 116¾ |
| 19 | Chancellor | 35 | 40 | 40 | 20 | 38 | 30 | 29 | 40 | 36 | 2 | 100 | 111 | 114 | 117 | 110½ |
| 20 | Bright | 34 | 10 | 36 | 20 | 40 | .. | 31 | 20 | 35 | 27 | 108 | 134 | 125 | 117 | 121 |
| 21 | Bedford | 33 | 20 | 33 | 20 | 31 | 40 | 30 | 20 | 32 | 10 | 109 | 132 | 126 | 116 | 120¾ |
| 22 | Nelson | 33 | 20 | 44 | 20 | 35 | 30 | 23 | 20 | 33 | 37 | 104 | 115 | 116 | 111 | 111½ |
| 23 | Mummy | 33 | 10 | 47 | 40 | 30 | 50 | 37 | .. | 37 | 10 | 104 | 123 | 124 | 115 | 116½ |
| 24 | Creeper | 32 | 40 | 23 | 20 | 43 | .. | 33 | 40 | 33 | 10 | 105 | 122 | 131 | 109 | 116¾ |
| 25 | Paragon | 31 | 20 | 34 | 20 | 57 | 50 | 29 | 30 | 38 | 12 | 107 | 134 | 125 | 116 | 120½ |
| 26 | New Potter | 31 | 10 | 48 | .. | 43 | 20 | 32 | .. | 38 | 37 | 106 | 124 | 116 | 113 | 114¾ |
| 27 | Fergus | 30 | 50 | 35 | .. | 30 | .. | 33 | 50 | 32 | 25 | 107 | 134 | 127 | 116 | 121 |
| 28 | Carleton | 30 | 40 | 41 | .. | 34 | 10 | 30 | 50 | 34 | 10 | 106 | 125 | 126 | 116 | 115¾ |
| 29 | Cooper | 30 | 30 | 39 | .. | 35 | 40 | 34 | 30 | 34 | 55 | 108 | 123 | 131 | 111 | 118¼ |
| 30 | Duke | 30 | 20 | 34 | .. | 44 | 30 | 27 | 50 | 34 | 10 | 105 | 131 | 124 | 115 | 118¾ |
| 31 | Prince Albert | 30 | 20 | 36 | .. | 39 | 30 | 35 | 20 | 35 | 17 | 112 | 135 | 127 | 113 | 121¾ |
| 32 | Bruce | 30 | .. | 45 | 40 | 49 | 30 | 28 | 40 | 38 | 27 | 108 | 130 | 120 | 117 | 118¾ |
| 33 | Victoria | 30 | .. | 39 | .. | 41 | 20 | 33 | .. | 35 | 50 | 109 | 130 | 126 | 116 | 120¼ |
| 34 | Agnes | 29 | 40 | 31 | .. | 32 | 10 | 37 | 20 | 32 | 32 | 104 | 128 | 123 | 116 | 117¾ |
| 35 | Gregory | 29 | 20 | 38 | .. | 32 | 40 | 34 | .. | 33 | 45 | 107 | 130 | 119 | 115 | 115¼ |
| 36 | Early Britain | 27 | 50 | 54 | 40 | 44 | .. | 29 | 10 | 38 | 55 | 99 | 119 | 116 | 106 | 110 |
| 37 | French Canner | 21 | 20 | 52 | 20 | 36 | .. | 25 | 20 | 33 | 45 | 100 | 119 | 116 | 105 | 110 |
| 38 | White Wonder | 20 | .. | 51 | .. | 40 | 20 | 39 | .. | 37 | 50 | 98 | 119 | 114 | 108 | 109¾ |
| 39 | Harrison's Glory | .. | .. | 59 | .. | 38 | 30 | 22 | 40 | 40 | 3 | .... | 111 | 116 | 104 | 110⅓ |
| 40 | Fenton | .. | .. | 45 | 20 | 29 | 40 | 31 | 30 | 35 | 30 | .... | 126 | 119 | 108 | 117⅔ |
| 41 | Alma | .. | .. | 44 | 40 | 32 | 40 | 32 | 40 | 36 | 40 | .... | 122 | 129 | 116 | 122⅓ |
| 42 | King | .. | .. | 42 | 20 | 40 | 10 | 39 | .. | 40 | 30 | .... | 121 | 125 | 115 | 120⅓ |
| 43 | Kent | .. | .. | 41 | 20 | 38 | 10 | 30 | .. | 36 | 30 | .... | 126 | 124 | 116 | 122 |
| 44 | Canadian Beauty | .. | .. | 39 | .. | 30 | 40 | 30 | 20 | 33 | 20 | .... | 128 | 125 | 110 | 121 |
| 45 | Daniel O'Rourke | .. | .. | 39 | .. | 40 | 20 | 34 | 40 | 38 | .. | .... | 126 | 124 | 106 | 118⅔ |
| 46 | Trilby | .. | .. | 37 | 20 | 55 | 10 | 27 | 30 | 40 | .. | .... | 129 | 127 | 115 | 123⅔ |
| 47 | Prince | .. | .. | 31 | 20 | 29 | 10 | 25 | .. | 28 | 30 | .... | 129 | 125 | 113 | 122⅓ |

The twelve varieties of pease which have given the largest crops at the several experimental farms during 1898, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur | 46 | 50 | 7. Perth | 39 | 30 |
| 2. Elephant Blue | 45 | 20 | 8. Crown | 39 | 10 |
| 3. Macoun | 40 | .. | 9. Multiplier | 38 | 40 |
| 4. Picton | 40 | .. | 10. Lanark | 38 | 30 |
| 5. Pride | 40 | .. | 11. Black-eyed Marrowfat | 38 | 20 |
| 6. Prussian Blue | 40 | .. | 12. Centennial | 38 | |

An average crop of 40 bushels 22 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Harrison's Glory | 59 | .. | 7. Vincent | 49 | .. |
| 2. Perth | 55 | 40 | 8. New Potter | 48 | .. |
| 3. Early Britain | 54 | 40 | 9. Black-eyed Marrowfat | 48 | .. |
| 4. Pride | 54 | 40 | 10. Mummy | 47 | 40 |
| 5. French Canner | 52 | 20 | 11. German White | 47 | 20 |
| 6. White Wonder | 51 | .. | 12. Arthur | 46 | .. |

An average crop of 51 bushels 7 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N. W. T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Paragon | 57 | 50 | 7. Pride | 44 | 50 |
| 2. Trilby | 55 | 10 | 8. Duke | 44 | 30 |
| 3. Perth | 49 | 30 | 9. Early Britain | 44 | .. |
| 4. Bruce | 49 | 30 | 10. New Potter | 43 | 20 |
| 5. Golden Vine | 49 | .. | 11. Elephant Blue | 43 | 10 |
| 6. Crown | 45 | 30 | 12. Creeper | 43 | .. |

An average crop of 47 bushels 27 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King | 39 | .. | 7. Prince Albert | 35 | 20 |
| 2. White Wonder | 39 | .. | 8. Gregory | 34 | 40 |
| 3. Agnes | 37 | 20 | 9. Crown | 34 | 40 |
| 4. Mummy | 37 | .. | 10. Daniel O'Rourke | 34 | 40 |
| 5. Macoun | 36 | 40 | 11. Cooper | 34 | 20 |
| 6. Elephant Blue | 36 | 20 | 12. Picton | 34 | 20 |

An average crop of 36 bushels 7 lbs. per acre.

The twelve varieties which have given the largest crops in 1898, taking the average results obtained on all the experimental farms, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Perth | 43 | 12 | 7. Vincent | 39 | 37 |
| 2. Pride | 43 | 2 | 8. Early Britain | 38 | 55 |
| 3. Elephant Blue | 40 | 52 | 9. Picton | 38 | 40 |
| 4. King | 40 | 30 | 10. New Potter | 38 | 37 |
| 5. Harrison's Glory | 40 | 3 | 11. German White | 38 | 32 |
| 6. Trilby | 40 | — | 12. Bruce | 38 | 27 |

An average crop of 40 bushels 2 lbs. per acre.

The average crop of all the varieties of pease tested at each of the experimental farms in 1898, was as follows :—At Ottawa, 34 bushels 30 lbs. ; Brandon 41 bushels 8 lbs. ; Indian Head, 37 bushels 59 lbs., and at Agassiz, 31 bushels 19 lbs. The average return given by the whole of the varieties, at all the farms, was 36 bushels 29 lbs. per acre.

## TRIAL PLOTS OF INDIAN CORN.

Twenty-four varieties of Indian Corn have been tested during 1898. These were planted on fairly uniform soil in rows three feet apart, and the plants thinned out to six or eight inches apart in the rows. The dates of planting were as follows:—At Ottawa, 18th May; Nappan, 28th May; Brandon, 23rd May, Indian Head, 16th May, and at Agassiz, 17th May. All were cut green and put into the silo for the winter feeding of stock. The dates of cutting were:—At Ottawa, 17th September; Nappan, 26th September; Brandon, 1st September; Indian Head, 7th September, and at Agassiz, 23rd September. The yield per acre has been calculated in each case from the weight obtained from two rows, each 66 feet long.

UNIFORM TEST PLOTS OF INDIAN CORN, YIELD AT THE SEVERAL EXPERIMENTAL FARMS, SEASON OF 1898.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. |
| 1 | Red Cob Ensilage.... | 24 | 1,170 | 18 | 300 | 27 | 1,440 | 14 | 1,964 | 33 | .... | 23 | 1,375 |
| 2 | Early Mastodon..... | 24 | 1,060 | 21 | 1,450 | 27 | 120 | 8 | 764 | 29 | 1,400 | 22 | 558 |
| 3 | Cloud's Early Yellow | 24 | 473 | 12 | 1,850 | 27 | 1,000 | 12 | 420 | 26 | 1,460 | 20 | 1,440 |
| 4 | Giant Prolific Ensilage. .......... | 22 | 1,100 | 16 | 1,550 | 25 | 380 | 15 | 492 | 38 | 450 | 23 | 1,194 |
| 5 | Early Butler........ | 21 | 1,340 | 12 | 970 | 24 | 1,940 | 12 | 552 | 28 | 100 | 19 | 1,780 |
| 6 | Evergreen Sugar .... | 21 | 900 | 11 | 550 | 14 | 160 | 6 | 540 | 16 | 1,000 | 13 | 1,830 |
| 7 | Rural Thoroughbred White Flint...... | 20 | 1,800 | 23 | 1,850 | 29 | 1,840 | 18 | 620 | 23 | 200 | 23 | 462 |
| 8 | Champion White Pearl.............. | 20 | 247 | 16 | 1,220 | 21 | 1,560 | 16 | 1,264 | 28 | 1,760 | 20 | 1,610 |
| 9 | Sanford............ | 20 | 113 | 20 | 1,800 | 23 | 200 | 13 | 1,720 | 22 | 1,100 | 20 | 186 |
| 10 | Selected Leaming.... | 19 | 1,380 | 14 | 1,150 | 19 | 1,160 | 13 | 796 | 22 | 220 | 17 | 1,741 |
| 11 | Pride of the North... | 19 | 940 | 15 | 1,350 | 24 | 1,500 | 9 | 742 | 29 | 80 | 19 | 1,322 |
| 12 | White Cap Yellow Dent............ | 19 | 170 | 17 | 1,200 | 28 | 1,200 | 12 | 1,740 | 25 | 160 | 20 | 1,294 |
| 13 | Extra Early Huron Dent.......... | 18 | 1,180 | 15 | 1,020 | 23 | 200 | 11 | 572 | 25 | 1,920 | 18 | 1,778 |
| 14 | Mammoth Cuban.... | 18 | 80 | 16 | 1,770 | 20 | 1,800 | 9 | 216 | 20 | 1,800 | 17 | 333 |
| 15 | King of the Earliest.. | 17 | 1,200 | 17 | 100 | 19 | 940 | 10 | 1,780 | 24 | 1,610 | 17 | 1,926 |
| 16 | Ruby Mexican.. .. | 17 | 100 | 9 | 150 | 19 | 720 | 8 | 632 | 22 | 1,980 | 15 | 716 |
| 17 | Mammoth Eight-rowed Flint.... ...... | 16 | 1,440 | 16 | 1,770 | 24 | 840 | 11 | 968 | 24 | 1,000 | 18 | 1,603 |
| 18 | Canada White Flint. | 16 | 340 | 17 | 100 | 21 | 1,200 | 12 | 816 | 21 | 900 | 17 | 1,471 |
| 19 | North Dakota White | 15 | 1,240 | 16 | 1,770 | 22 | 1,100 | 8 | 236 | 22 | 1,320 | 17 | 333 |
| 20 | Longfellow......... | 14 | 1,920 | 17 | 650 | 23 | 1,080 | 10 | 1,384 | 19 | 1,600 | 17 | 526 |
| 21 | Pearce's Prolific..... | 14 | 1,113 | 17 | 1,200 | 25 | 600 | 9 | 1,800 | 24 | 1,000 | 18 | 742 |
| 22 | Angel of Midnight.. | 14 | 1,060 | 16 | 450 | 21 | 1,720 | 11 | 1,232 | 21 | 900 | 17 | 1,472 |
| 23 | Compton's Early.... | 13 | 180 | 16 | 1,550 | 25 | 1,700 | 14 | 1,568 | 24 | 1,500 | 19 | 99 |
| 24 | Mitchell's Extra Early | 11 | 660 | 9 | 1,250 | 23 | 1,300 | 9 | 876 | 16 | 1,200 | 14 | 257 |

The six varieties of Indian Corn which have given the heaviest crops at the several experimental farms during 1898, are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Red Cob Ensilage........... | 24 | 1,170 |
| 2. Early Mastodon............ | 24 | 1,060 |
| 3. Cloud's Early Yellow.... ... | 24 | 473 |
| 4. Giant Prolific Ensilage....... | 22 | 1,100 |
| 5. Early Butler .. .. ........ .... | 21 | 1,340 |
| 6. Evergreen Sugar....... .... | 21 | 800 |

An average crop of 23 tons 340 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoroughbred White Flint... | 23 | 1,850 | 4. Red Cob Ensilage........... | 18 | 300 |
| 2. Early Mastodon............... | 21 | 1,450 | 5. Pearce's Prolific.............. | 17 | 1,200 |
| 3. Sanford....................... | 20 | 1,800 | 6. White Cap Yellow Dent...... | 17 | 1,200 |

An average crop of 19 tons 1,967 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoroughbred White Flint... | 29 | 1,840 | 4. Cloud's Early Yellow........ | 27 | 1,000 |
| 2. White Cap Yellow Dent...... | 28 | 1,200 | 5. Early Mastodon............. | 27 | 120 |
| 3. Red Cob Ensilage............ | 27 | 1,440 | 6. Comptons's Early........... | 25 | 1,700 |

An average crop of 27 tons 1,550 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoroughbred White Flint... | 18 | 620 | 4. Red Cob Ensilage............ | 14 | 1,964 |
| 2. Champion White Pearl..... | 16 | 1,264 | 5. Compton's Early............. | 14 | 1,568 |
| 3. Giant Prolific Ensilage...... | 15 | 492 | 6. Sanford ......................... | 13 | 1,720 |

An average crop of 15 tons 1,271 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Prolific Ensilage....... | 38 | 450 | 4. Pride of the North.......... | 29 | 80 |
| 2. Red Cob Ensilage............ | 33 | ..... | 5. Champion White Pearl....... | 28 | 1,760 |
| 3. Early Mastodon.............. | 29 | 1,400 | 6. Early Butler ................ | 28 | 100 |

An average crop of 31 tons 298 lbs. per acre.

The six varieties of Indian Corn which have given the heaviest crops, in 1898, taking the average of the results obtained on all the experimental farms, are as follows :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage ........... | 23 | 1,375 | 4. Early Mastodon............. | 22 | 558 |
| 2. Giant Prolific Ensilage...... | 23 | 1,194 | 5. Champion White Pearl....... | 20 | 1,610 |
| 3. Thoroughbred White Flint... | 23 | 462 | 6. Cloud's Early Yellow........ | 20 | 1,440 |

An average crop of 22 tons 773 lbs. per acre.

As the season of 1898 was very favourable for maturing the corn crop, all the varieties grown, attained a sufficient degree of ripeness to permit of their being made into useful and nutritious food for stock.

The average weight cut green of all the varieties of Indian Corn, tested at each of the experimental farms, in 1898, was as follows :—At Ottawa, 18 tons 1,216 lbs. ; Nappan, 15 tons 1,625 lbs. ; Brandon, 23 tons 1,450 lbs. ; Indian Head, 11 tons 1,399 lbs. ; and at Agassiz, 24 tons 1,444 lbs. The average return given by the whole of the varieties at all the farms was 18 tons 1,827 lbs per acre.

## TRIAL PLOTS OF TURNIPS.

Nineteen varieties of turnips were tested during 1898, sown on drills or on the flat, 2½ feet apart. Two sowings were made at each farm, one sowing two weeks later than the other. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows :—At Ottawa, 13th October ; Nappan, 14th October ; Brandon, 7th October ; Indian Head, 11th October, and at Agassiz, on the 19th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

# UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety. | Ottawa, Ont. Sown 28th April | Ottawa, Ont. Sown 6th May. | Nappan, N.S. Sown 25th May. | Nappan, N.S. Sown 7th June. | Brandon, Man. Sown 17th May. | Brandon, Man. Sown 1st June. | Indian Head, N.W.T. Sown 14th May. | Indian Head, N.W.T. Sown 25th May. | Agassiz, B.C. Sown 9th May. | Agassiz, B.C. Sown 23rd May. | Average of all Farms. First Sowing. | Average of all Farms. Second Sowing. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Purple Top Swede......... | 29 740 | 29 1,565 | 27 1,825 | 22 950 | 45 288 | 57 1,104 | 21 636 | 19 1,864 | 58 1,040 | 56 112 | 36 906 | 37 339 |
| 2 | Giant King....... ........ | 29 740 | 24 1,500 | 29 725 | 23 1,125 | 34 1,696 | 40 256 | 27 120 | 19 808 | 49 624 | 32 120 | 33 1,981 | 27 1,962 |
| 3 | Jumbo... .. ....... ... . | 27 1,275 | 26 1,790 | 27 1,100 | 23 400 | 39 1,728 | 44 1,760 | 20 788 | 23 728 | 58 336 | 40 1,312 | 34 1,445 | 31 1,598 |
| 4 | Mammoth Clyde... ...... | 27 1,275 | 26 470 | 30 1,190 | 21 755 | 33 528 | 34 640 | 24 840 | 24 1,500 | 26 800 | 25 1,568 | 28 872 | 26 987 |
| 5 | Drummond Purple Top. ... | 27 1,110 | 27 120 | 27 1,390 | 21 1,790 | 28 1,024 | 33 1,584 | 26 272 | 19 1,600 | 35 576 | 33 .... | 29 1,704 | 29 212 |
| 6 | Marquis of Lorne...... .... | 27 780 | 26 1,130 | 29 ... | 26 490 | 28 496 | 35 1,280 | 20 128 | 21 108 | 29 784 | 29 168 | 26 1,638 | 27 1,435 |
| 7 | Shamrock Purple Top..... | 26 1,625 | 26 1,295 | 27 375 | 21 1,500 | 39 672 | 35 1,808 | 25 424 | 21 1,824 | 30 1,424 | 29 1,840 | 29 1,704 | 27 453 |
| 8 | Bangholm Selected. .. ... | 26 800 | 24 1,995 | 28 840 | 21 50 | 29 1,664 | 38 32 | 19 940 | 21 1,560 | 47 864 | 31 1,240 | 30 621 | 26 575 |
| 9 | Skirvings........ .. ..... | 26 470 | 27 615 | 28 1,275 | 20 1,650 | 31 1,888 | 44 1,760 | 22 1,540 | 22 880 | 40 1,312 | 35 752 | 30 97 | 30 332 |
| 10 | Halewood's Bronze Top.... | 25 1,645 | 27 615 | 30 465 | 29 1,160 | 31 304 | 39 1,200 | 25 688 | 22 1,012 | 43 1,120 | 28 144 | 31 445 | 29 826 |
| 11 | Prize Purple Top... . .... | 25 820 | 21 1,735 | 26 925 | 25 1,475 | 38 32 | 39 1,022 | 21 1,956 | 15 756 | 30 1,952 | 27 1,440 | 28 1,137 | 29 99 |
| 12 | Perfection Swede.......... | 25 820 | 29 410 | 28 115 | 28 1,275 | 34 112 | 50 320 | 21 1,032 | 17 848 | 43 1,120 | 30 1,952 | 30 1,030 | 31 561 |
| 13 | Prize Winner.............. | 25 490 | 26 305 | 28 115 | 22 225 | 36 1,920 | 43 1,620 | 19 1,996 | 18 1,356 | 35 664 | 34 992 | 28 1,837 | 29 99 |
| 14 | Hall's Westbury. ... . ... | 25 325 | 23 860 | 29 1,740 | 23 1,125 | 31 1,888 | 40 1,840 | 28 892 | 22 880 | 43 1,032 | 28 144 | 31 1,575 | 27 1,370 |
| 15 | Hartley's Bronze...... . | 24 1,335 | 25 655 | 30 175 | 27 1,535 | 38 1,616 | 42 480 | 25 1,480 | 21 768 | 30 1,600 | 29 80 | 30 41 | 29 304 |
| 16 | Sutton's Champion......... | 24 840 | 26 1,625 | 27 1,390 | 22 515 | 32 944 | 50 1,376 | 24 1,764 | 22 616 | 40 1,400 | 38 1,440 | 30 68 | 32 714 |
| 17 | Champion Purple Top...... | 23 200 | 23 1,850 | 28 550 | 23 1,415 | 34 1,168 | 48 1,680 | 26 800 | 19 1,468 | 29 256 | 28 1,904 | 28 595 | 29 63 |
| 18 | Carter's Elephant ......... | 22 880 | 26 1,955 | 30 1,915 | 25 25 | 33 528 | 31 1,360 | 20 524 | 16 736 | 29 960 | 28 320 | 27 561 | 25 1,279 |
| 19 | East Lothian............ . | 22 385 | 30 1,710 | 27 375 | 23 400 | 32 944 | 44 704 | 27 384 | 21 768 | 43 1,384 | 25 952 | 30 1,094 | 29 107 |

The crops from the two sowings of turnips at the experimental farms in 1898 have averaged per acre as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing..................... | 25 | 1,298 |
| do do second sowing... .......... ..... | 26 | 842 |
| Experimental Farm, Nappan, first sowing.... ....... ..... . | 28 | 1,185 |
| do do second sowing... .. ..... ..... | 23 | 1,918 |
| Experimental Farm, Brandon, first sowing.................... | 34 | 397 |
| Experimental Farm, Brandon, second sowing......... ... ... | 41 | 1,902 |
| Experimental Farm, Indian Head, first sowing............... | 23 | 1,338 |
| do do second sowing ... ... .... | 21 | 263 |
| Experimental Farm, Agassiz, first sowing..................... | 39 | 618 |
| do do second sowing.................. | 32 | 552 |

**Average crop from all the plots at all the farms, first sowing, 30 tons 797 lbs.; second sowing, 29 tons 309 lbs. per acre.**

The six varieties of turnips which have given the heaviest crops at the several experimental farms during the season of 1898, are the following. (Where not otherwise stated the quantities given are all from the early sown plots) :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. East Lothian (2nd sowing)... | 30 | 1,710 | 4. Perfection Swede (2nd sowing) | 29 | 410 |
| 2. Purple Top Swede (2nd sowing) | 29 | 1,565 | 5. Jumbo ....... .......... | 27 | 1,275 |
| 3. Giant King................ | 29 | 740 | 6. Mammoth Clyde........... | 27 | 1,275 |

An average crop of 29 tons 162 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Carter's Elephant........ | 30 | 1,915 | 4. Hartley's Bronze.......... | 30 | 175 |
| 2. Mammoth Clyde............ | 30 | 1,190 | 5. Hall's Westbury...... .... | 29 | 1,740 |
| 3. Halewood's Bronze Top..... | 30 | 465 | 6. Giant King................ | 29 | 725 |

An average crop of 30 tons 635 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Purple Top Swede (2nd sowing) | 57 | 1,104 | 4. Selected Champion (2nd sowing).................. ... | 48 | 1,680 |
| 2. Sutton's Champion (2nd sowing.......... .......... | 50 | 1,376 | 5. Purple Top Swede.......... | 45 | 288 |
| 3. Perfection Swede (2nd sowing) | 50 | 320 | 6. Jumbo (2nd sowing)...... . | 44 | 1,760 |

An average crop of 49 tons 1,088 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hall's Westbury............ | 28 | 892 | 4. Selected Champion......... | 26 | 800 |
| 2. East Lothian............ .... | 27 | 384 | 5. Drummond Purple Top..... | 26 | 272 |
| 3. Giant King................ | 27 | 120 | 6. Hartley's Bronze........... | 25 | 1,480 |

An average crop of 26 tons 1,658 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Purple Top Swede.......... | 58 | 1,040 | 4. Bangholm Selected......... | 47 | 864 |
| 2. Jumbo ...................... | 58 | 336 | 5. Sutton's Champion........ | 40 | 1,400 |
| 3. Giant King................. | 49 | 624 | 6. Skirving's.................. | 40 | 1,312 |

An average crop of 49 tons 262 lbs. per acre.

The six varieties of turnips which have produced the heaviest crops, in 1898, taking the average of the results obtained on all the experimental farms, are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Purple Top Swede (2nd sowing) | 37 | 339 | 4. Sutton's Champion (2nd sowing) | 32 | 714 |
| 2. Jumbo | 34 | 1,445 | 5. Hall's Westbury | 31 | 1,575 |
| 3. Giant King | 33 | 1,981 | 6. Perfection Swede (2nd sowing) | 31 | 561 |

An average crop of 33 tons 1,102 lbs. per acre.

The early sown plots have given this year the larger crops at Nappan, Indian Head and Agassiz, but at Ottawa there has been a slight advantage in favour of the second sowing, and at Brandon a decided advantage in this particular. The average results, however, from all the farms show a difference of 1 ton 488 lbs. per acre in favour of the first sowing.

## TRIAL PLOTS OF MANGELS.

Eighteen varieties of mangels have been under test in 1898, all sown on drills or on the flat $2\frac{1}{2}$ feet apart. Two sowings were made at each farm, the second sowing two weeks later than the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following :—At Ottawa, 13th October; Nappan, 8th October; Brandon, 4th October; Indian Head, 11th October, and at Agassiz, 19th October.

The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long. Nos. 3 and 5, the Yellow Intermediate and Mammoth Yellow Intermediate were not sown at Agassiz for the reason that the seed was lost in transit, and the second sowing of Nos. 16 and 17, Mammoth Oval Shaped and Red Fleshed Tankard are not reported on at Brandon because the seed did not germinate.

# UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown 28th April | Sown 6th May. | Sown 25th May. | Sown 7th June. | Sown 17th May. | Sown 1st June. | Sown 14th May. | Sown 25th May. | Sown 28th April | Sown 12th May. | First Sowing. | Second Sowing. |
| | | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. | Per acre. |
| | | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. |
| 1 | **Gate Post** | 33 1,485 | 26 800 | 28 1,275 | 22 1,387 | 50 584 | 69 1,392 | 28 476 | 27 120 | 35 400 | 34 464 | 35 444 | 36 32 |
| 2 | Giant Yellow Globe | 33 ... | 24 345 | 30 175 | 38 125 | 57 1,104 | 53 392 | 28 1,552 | 28 54 | 17 1,200 | 14 1,040 | 33 806 | 31 1,191 |
| 3 | Yellow Intermediate | 31 1,525 | 24 1,500 | 29 1,450 | 18 1,700 | 55 880 | 65 416 | 29 212 | 22 1,672 | ...... | ...... | 36 1,016 | 32 1,822 |
| 4 | Giant Yellow Half Long | 30 1,215 | 23 1,520 | 28 550 | 18 250 | 51 960 | 43 328 | 23 1,916 | 26 8 | 22 1,056 | 22 264 | 31 739 | 26 1,274 |
| 5 | Mamm. Yellow Intermediate. | 30 390 | 26 305 | 25 1,040 | 23 1,850 | 44 1,760 | * | 24 1,896 | 26 4 | ...... | ...... | 31 759 | 25 719 |
| 6 | Canadian Giant | 28 595 | 20 95 | 19 1,875 | 21 1,500 | 53 656 | 60 1,440 | 30 1,908 | 25 988 | 29 1,840 | 29 872 | 32 974 | 31 971 |
| 7 | Mamm. Long Red | 27 1,770 | 23 1,355 | 23 1,415 | 23 1,850 | 50 320 | 45 1,080 | 24 1,500 | 22 768 | 33 880 | 32 1,120 | 31 1,977 | 29 1,234 |
| 8 | Prize Mamm. Long Red | 27 615 | 23 1,685 | 27 1,390 | 27 1,100 | 44 176 | 49 1,792 | 21 1,228 | 23 68 | 26 976 | 24 1,280 | 29 877 | 29 1,585 |
| 9 | Giant Yellow Intermediate | 26 1,130 | 23 860 | 30 1,635 | 25 1,475 | 45 1,608 | 56 992 | 27 1,364 | 22 880 | 30 1,776 | 29 1,400 | 32 702 | 31 1,121 |
| 10 | Norbiton Giant | 26 965 | 25 1,150 | 25 750 | 16 625 | 48 1,416 | 41 1,952 | 24 1,764 | 26 1,064 | 24 400 | 22 1,760 | 29 1,859 | 26 1,310 |
| 11 | Golden Fleshed Tankard | 24 1,665 | 16 1,165 | 19 425 | 18 250 | 45 288 | 34 640 | 23 1,520 | 25 1,628 | 24 1,280 | 22 264 | 27 1,055 | 23 789 |
| 12 | Champion Yellow Globe | 24 345 | 21 735 | 26 925 | 24 640 | 23 1,784 | 38 1,880 | 25 688 | 24 412 | 24 1,984 | 24 752 | 24 1,945 | 26 1,283 |
| 13 | Ward's Large Oval Shaped | 23 1,850 | 18 300 | 20 1,325 | 15 1,175 | 42 1,536 | 44 704 | 23 1,184 | 22 88 | 21 64 | 17 1,200 | 26 791 | 23 1,093 |
| 14 | Warden Orange Globe | 23 860 | 19 1,600 | 21 1,500 | 20 1,325 | 30 1,512 | 45 1,872 | 23 596 | 24 1,688 | 30 1,424 | 29 80 | 25 1,978 | 28 113 |
| 15 | Selected Mamm. Long Red | 23 860 | 20 260 | 19 1,875 | 19 1,875 | 41 368 | 64 1,888 | 22 1,500 | 25 48 | 35 1,456 | 35 48 | 28 1,211 | 33 23 |
| 16 | Mamm. Oval Shaped | 20 1,415 | 14 1,040 | 22 1,675 | 19 425 | 40 256 | * | 21 1,560 | 22 88 | 35 928 | 35 576 | 28 366 | 22 1,532 |
| 17 | Gate Post Yellow | 16 835 | 20 590 | 29 725 | 16 1,350 | 38 1,880 | 55 880 | 24 180 | 27 1,704 | 21 1,120 | 20 40 | 26 148 | 28 112 |
| 18 | Red Fleshed Tankard | 16 10 | 16 670 | 19 1,875 | 21 1,500 | 46 400 | * | 23 1,784 | 25 488 | 17 1,960 | 14 1,832 | 24 1,605 | 19 1,122 |

* Did not germinate.

The crops from the two sowings of mangels at the experimental farms in 1898 have averaged per acre as follows :

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 26 | 85 |
| " " second sowing | 21 | 1,220 |
| Experimental Farm, Nappan, first sowing | 24 | 1,993 |
| " " second sowing | 21 | 1,689 |
| " Brandon, first sowing | 45 | 81 |
| Experimental Farm, Brandon, second sowing | 51 | 643 |
| " Indian Head, first sowing | 25 | 376 |
| " " second sowing | 24 | 1,653 |
| " Agassiz, first sowing | 27 | 46 |
| " " second sowing | 25 | 1,062 |

Average crop from all the plots at all the farms, first sowing 29 tons 1,568 lbs., second sowing, 28 tons 295 lbs.

The six varieties of mangels which have produced the heaviest crops at the several experimental farms during 1898, are the following. (Unless otherwise stated, the yields given are all from the earliest sown plots) :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post | 33 | 1,485 | 4. Yellow Intermediate | 31 | 1,525 |
| 2. Giant Yellow Globe | 33 | ..... | 5. Giant Yellow Half-long | 30 | 1,215 |
| 3. Golden Tankard | 32 | 1,505 | 6. Mammoth Yellow Intermediate | 30 | 390 |

An average crop of 32 tons 20 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Globe (2nd sowing) | 38 | 125 | 4. Gate Post Yellow | 29 | 725 |
| 2. Giant Yellow Intermediate | 30 | 1,635 | 5. Gate Post | 28 | 1,275 |
| 3. Yellow Intermediate | 29 | 1,450 | 6. Giant Yellow Half-long | 28 | 550 |

An average crop of 30 tons 1,627 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post (2nd sowing) | 69 | 1,392 | 4. Canadian Giant (2nd sowing) | 60 | 1,440 |
| 2. Yellow Intermediate (2nd sowing) | 65 | 416 | 5. Giant Yellow Globe | 57 | 1,104 |
| 3. Selected Mamm. Long Red (2nd sowing) | 64 | 1,888 | 6. Red Fleshed Tankard (2nd sowing) | 56 | 992 |

An average crop of 62 tons 872 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Giant | 30 | 1,908 | 4. Gate post | 28 | 476 |
| 2. Yellow Intermediate | 29 | 212 | 5. Gate post yellow (2nd sowing) | 27 | 1,704 |
| 3. Giant Yellow Globe | 28 | 1,552 | 6. Norbiton Giant (2nd sowing) | 26 | 1,064 |

An average crop of 28 tons 1,153 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Mam. Long Red | 35 | 1,456 | 4. Mamm. Long Red | 33 | 880 |
| 2. Mamm. Oval-shaped | 35 | 928 | 5. Giant Yellow Intermediate | 30 | 1,776 |
| 3. Gate Post | 35 | 400 | 6. Warden Orange Globe | 30 | 1,424 |

An average crop of 40 tons 572 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops in 1898, taking the average of the results obtained at all the experimental farms, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate.......... | 36 | 1,016 | 4. Canadian Giant ............. | 32 | 974 |
| 2. Gate Post (2nd sowing)........ | 36 | 32 | 5. Giant Yellow Intermediate... | 32 | 702 |
| 3. Giant Yellow Globe........... | 33 | 806 | 6. Norbiton Giant............. | 29 | 1,859 |

An average crop of 33 tons 898 lbs. per acre.

The early sown plots of mangels have given larger crops than those later sown at all the experimental farms, excepting at Brandon, where the advantage has been with the second sowing. The average results from all the farms show a difference of 1 ton 1,273 lbs. per acre in favour of the first sowing.

## TRIAL PLOTS OF CARROTS.

Sixteen varieties of carrots were under test during 1898 all sown in drills or on the flat 2 feet apart. Two sowings were made in each case, the second sowing two weeks after the first, excepting at the branch farm at Indian Head, where only one sowing was made. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following:—At Ottawa, 13th October; Nappan, 7th October; Brandon, 11th October; Indian Head, 13th October and at Agassiz, 19th October. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. Sown 28th April | Ottawa, Ont. Sown 6th May. | Nappan, N.S. Sown 25th May. | Nappan, N.S. Sown 7th June. | Brandon, Man. Sown 17th May. | Brandon, Man. Sown 1st June. | Indian Head, N.W.T. Sown 13th May. | Agassiz, B.C. Sown 28th April | Agassiz, B.C. Sown 12th May. | Average of all Farms. First Sowing. | Average of all Farms. Second Sowing. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Mamm. White Intermediate | 28 1,090 | 27 1,110 | 17 75 | 13 1,555 | 12 200 | 12 640 | 8 1,688 | 34 630 | 32 1,696 | 22 1,999 | 21 1,250 |
| 2 | Giant White Vosges | 25 35 | 18 640 | 15 450 | 12 1,665 | 10 1,560 | 10 240 | 7 256 | 25 1,333 | 22 .... | 19 345 | 15 1,636 |
| 3 | Improved Short White | 22 1,870 | 22 220 | 15 15 | 14 565 | 7 1,400 | 12 1,080 | 9 216 | 32 826 | 42 333 | 19 1,028 | 22 1,550 |
| 4 | Early Gem | 22 1,705 | 20 1,415 | 14 1,000 | 14 565 | 12 200 | 11 1,760 | 7 1,840 | 25 1,333 | 24 1,133 | 18 1,560 | 17 1,718 |
| 5 | Ontario Champion | 21 1,230 | 13 730 | 13 100 | 11 185 | 9 480 | 12 200 | 9 480 | 28 1,200 | 27 1,000 | 18 253 | 16 29 |
| 6 | Iverson's Champion | 21 900 | 19 280 | 13 1,550 | 10 1,460 | 12 200 | 9 1,360 | 7 520 | 25 1,726 | 24 693 | 18 594 | 15 1,948 |
| 7 | Half Long White | 20 95 | 21 1,560 | 16 915 | 14 275 | 11 880 | 11 1,760 | 9 1,404 | 37 214 | 32 972 | 21 526 | 20 142 |
| 8 | Guerande, or Ox Heart | 19 1,600 | 19 280 | 10 1,750 | 14 1,725 | 7 960 | 8 1,600 | 7 520 | 27 853 | 27 256 | 16 791 | 17 965 |
| 9 | Green Top White Orthe | 19 940 | 14 1,862 | 14 1,725 | 10 735 | 11 1,320 | 9 40 | 9 1,272 | 32 826 | 29 666 | 19 1,203 | 15 1,826 |
| 10 | Half Long Chantenay | 16 175 | 14 1,370 | 13 825 | 13 390 | 10 1,560 | 10 680 | 9 600 | 32 1,266 | 24 400 | 18 457 | 15 1,210 |
| 11 | Yellow Intermediate | 14 1,370 | 13 1,225 | 11 1,490 | 13 825 | 6 1,640 | 8 1,600 | 7 1,180 | 35 1,720 | 29 1,986 | 17 555 | 16 909 |
| 12 | White Belgian | 14 710 | 18 1,950 | 15 740 | 8 1,835 | 12 1,080 | 8 1,160 | 8 236 | 36 1,626 | 35 986 | 19 1,539 | 17 1,983 |
| 13 | Carter's Orange Giant | 12 1,905 | 12 915 | 11 40 | 10 1,315 | 6 320 | 7 80 | 6 1.200 | 20 153 | 16 1,626 | 12 1,105 | 11 1,484 |
| 14 | Long Orange or Surrey | 12 750 | 11 605 | 9 1,865 | 9 415 | * | 6 1,640 | 4 996 | 12 1,666 | 15 1,083 | 11 1,427 | 10 1,436 |
| 15 | Scarlet Intermediate | 12 255 | 11 110 | 7 935 | 6 1,050 | 9 40 | 8 720 | 6 276 | 24 400 | 15 1,000 | 13 408 | 10 720 |
| 16 | Long Scarlet Altringham | 7 1,810 | 8 1,820 | 8 240 | 10 300 | * | * | 4 1,504 | 20 1,946 | 16 560 | 12 665 | 11 1,560 |

* Did not germinate.

The crops from the two sowings of carrots at the experimental farms have averaged per acre as follows :—

| | Tons | Lbs. |
|---|---|---|
| Central Experimental Farm, Ottawa, Ont., first sowing | 18 tons | 528 lbs. |
| " " second sowing | 16 " | 1,506 " |
| Experimental Farm, Nappan, N.S., first sowing | 12 " | 1,982 " |
| " " second sowing | 11 " | 1,554 " |
| " Brandon, Man., first sowing | 9 " | 1,989 " |
| " " second sowing | 9 " | 1,771 " |
| Experimental Farm, Indian Head, one sowing only | 7 tons | 1,387 lbs. |
| " Agassiz, B.C., first sowing | 28 " | 607 " |
| " " second sowing | 26 " | 24 " |
| Average crop from all the farms, omitting the one sowing from Indian Head, first sowing | 17 " | 777 " |
| Average crop from all the farms, second sowing | 16 " | 214 " |

The six varieties of carrots which have produced the heaviest crops at the several experimental farms during 1898 are the following.

(Unless otherwise stated the yields given are all from the earliest sown plots.)

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate. | 28 | 1,090 | 4. Early Gem ........... | 22 | 1,705 |
| 2. Large White Vosges......... | 25 | 35 | 5. Ontario Champion ......... | 21 | 1,230 |
| 3. Improved Short White . .. | 22 | 1,870 | 6. Iverson's Champion.... .... | 21 | 900 |

An average crop of 23 tons 1,472 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate. | 17 | 75 | 4. Giant White Vosges........ | 15 | 450 |
| 2. Half Long White .... ...... | 16 | 915 | 5. Improved Short White...... | 15 | 15 |
| 3. White Belgian.... ........ | 15 | 740 | 6. Green Top White Orthe.... | 14 | 1,725 |

An average crop of 15 tons 1,320 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White (2nd sowing)... ................ | 12 | 1,080 | 4. Iverson's Champion......... | 12 | 200 |
| 2. White Belgian ... .... ... | 12 | 1,080 | 5. Ontario Champion (2nd sowing)................. ... | 12 | 200 |
| 3. Mamm. White Intermediate (2nd sowing)............... | 12 | 640 | 6. Early Gem..... .... ...... | 12 | 200 |

An average crop of 12 tons 567 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White ... ...... | 9 | 1,404 | 4. Ontario Champion.......... | 9 | 480 |
| 2. Green Top White Orthe...... | 9 | 1,272 | 5. Improved Short White. .... | 9 | 216 |
| 3. Half Long Chantenay.. ... . | 9 | 600 | 6. Mamm White Intermediate. | 8 | 1,688 |

An average crop of 9 tons 610 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White (2nd sowing)................... | 42 | 333 | 4. Yellow Intermediate.. ..... | 35 | 1,720 |
| 2. Half Long White. .. ..... | 37 | 214 | 5. Mamm. White Intermediate | 34 | 630 |
| 3. White Belgian.... .......... | 36 | 1,626 | 6. Half Long Chantenay..... . | 32 | 1,266 |

An average crop of 36 tons 965 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops, in 1898, taking the average of the results obtained on all the experimental farms are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate. | 22 | 1,999 | 4. White Belgian.............. | 19 | 1,539 |
| 2. Improved Short White (2nd sowing).. ....... ........ | 22 | 1,550 | 5. Green Top White Orthe..... | 19 | 1,203 |
| 3. Half Long White............ | 21 | 526 | 6. Giant White Vosges........ | 19 | 345 |

An average crop of 25 tons 232 lbs. per acre.

Leaving out of consideration the single sowing at the Indian Head farm, the average crops from the first sowings at all the other farms have exceeded those from the second sowings by 1 ton 563 lbs. per acre.

## TRIAL PLOTS OF SUGAR BEETS.

Six varieties of sugar beets have been tested during 1898, sown in drills or on the flat two feet apart. Two sowings were made in each case, the second sowing about two weeks after the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following, at Ottawa, 13th October ; Nappan, 6th October ; Brandon, 4th October ; Indian Head, 12th October ; and at Agassiz, 19th October. The yield per acre in each instance has been calculated from the weight of roots gathered from two rows each 66 feet long.

# UNIFORM TEST PLOTS OF SUGAR BEETS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown 28th April | | Sown 6th May. | | Sown 25th May. | | Sown 7th June. | | Sown 17th May. | | Sown 1st June. | | Sown 14th May. | | Sown 24th May. | | Sown 9th May. | | Sown 23rd May. | | First Sowing. | | Second Sowing. | |
| | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | |
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Danish Improved......... | 17 | 1,970 | 18 | 300 | 23 | 1,850 | 22 | 1,240 | 34 | 1,696 | 39 | 144 | 21 | 372 | 23 | 1,124 | 26 | 1,064 | 20 | 656 | 24 | 902 | 23 | 1,464 |
| 2 | Wanzleben............... | 15 | 1,020 | 16 | 340 | 16 | 625 | 14 | 355 | 38 | 560 | 25 | 1,480 | 17 | 56 | 15 | 1,944 | 21 | 1,912 | 21 | 1,560 | 21 | 1,634 | 18 | 1,536 |
| 3 | Danish Red Top .......... | 14 | 1,700 | 14 | 1,390 | 28 | 1,565 | 19 | 1,585 | 41 | 104 | 51 | 960 | 23 | 332 | 24 | 312 | 35 | 576 | 27 | 384 | 28 | 1,255 | 27 | 926 |
| 4 | Improved Imperial ........ | 13 | 1,720 | 15 | 525 | 21 | 775 | 17 | 1,255 | 30 | 1,776 | 34 | 1,168 | 16 | 736 | 16 | 340 | 30 | 192 | 29 | 1,664 | 22 | 1,039 | 22 | 1,390 |
| 5 | Red Top Sugar......... ... | 12 | 1,905 | 14 | 1,370 | 24 | 1,300 | 17 | 365 | 30 | 1,776 | 36 | 1,920 | 16 | 472 | 18 | 828 | 35 | 1,456 | 30 | 928 | 21 | 181 | 23 | 1,082 |
| 6 | Vilmorin's Improved....... | 9 | 975 | 10 | 295 | 15 | 1,175 | 11 | 765 | 26 | 1,328 | 31 | 1,361 | 11 | 836 | 14 | 1,568 | 29 | 432 | 27 | 1,440 | 18 | 949 | 19 | 285 |

**The crop from the two sowings of sugar beets at the experimental farms have averaged as follows:—**

| | Per acre. Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 14 | 215 |
| " " second sowing | 14 | 1,703 |
| Experimental Farm, Nappan, first sowing | 21 | 1,548 |
| " " " second sowing | 17 | 260 |
| Experimental Farm, Brandon, first sowing | 33 | 1,540 |
| " " " second sowing | 36 | 1,172 |
| Experimental Farm, Indian Head, first sowing | 17 | 1,134 |
| " " " second sowing | 18 | 1,686 |
| Experimental Farm, Agassiz, first sowing | 29 | 1,605 |
| " " " second sowing | 27 | 338 |

Average crop from all the farms: first sowing, 22 tons 1660; second sowing, 22 tons 1113 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops at the several experimental farms during 1898, are the following.

(Unless otherwise stated the yields given are all from the earliest sown plots).

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved (2nd sowing) | 18 | 300 | 3. Improved Imperial (2nd sowing)........... | 15 | 525 |
| 2. Wanzleben (2nd sowing)...... | 16 | 340 | 4. Danish Red Top............ | 14 | 1,700 |

An average crop of 16 tons 216 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top............ | 28 | 1,565 | 3. Danish Improved.......... | 23 | 1,850 |
| 2. Red Top Sugar.......... ... | 24 | 1,300 | 4. Improved Imperial........ | 21 | 775 |

An average crop of 24 tons 1,372 lbs. per acre.

EXPERIMEMTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top (2nd sowing) | 51 | 960 | 3. Wanzleben.............. | 38 | 560 |
| 2. Danish Improved (2nd sowing) | 39 | 144 | 4. Red Top Sugar (2nd sowing). | 36 | 1,920 |

An average crop of 41 tons 896 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top (2nd sowing) | 24 | 312 | 3. Red Top Sugar (2nd sowing). | 18 | 828 |
| 2. Danish Improved(2nd sowing) | 23 | 1,124 | 4. Wanzleben................. | 17 | 56 |

An average crop of 20 tons 1,580 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar............. | 35 | 1,456 | 3. Improved Imperial......... | 30 | 192 |
| 2. Danish Red Top........ ..... | 35 | 576 | 4. Vilmorin's Improved.. . . .. | 29 | 432 |

An average crop of 32 tons 1,164 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops in 1898, taking the average of the results obtained at all the experimental farms are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top............. | 28 | 1,255 | 3. Red Top Sugar (2nd sowing). | 23 | 1,062 |
| 2. Danish Improved........ | 24 | 902 | 4. Improved Imperial (2nd sowing)..................... | 22 | 1,390 |

An average crop of 24 tons 1,652 lbs. per acre.

The average crop from the first and second sowings of sugar beets differ but little this year, the gain from early sowing averaging only 547 lbs. per acre.

## TRIAL PLOTS OF POTATOES.

One hundred and four varieties of potatoes have been under trial in uniform test plots during 1898. The potatoes for planting were cut into pieces with two or three eyes in each, and these were planted in rows $2\frac{1}{2}$ feet apart, the sets being placed a foot apart in the rows. The dates of planting and digging were the following. At Ottawa, planted 26th and

27th May; dug 6th and 7th October. Nappan, planted June 4th; dug 21st September. Brandon, planted 16th May; dug 4th October. Indian Head, planted 13th May; dug 30th September, and at Agassiz, planted 13th May and dug from 19th September to 3rd October. The yield per acre has been calculated in each case from the weight of tubers gathered from two rows each 66 feet long.

## Uniform Test Plots of Potatoes.

| Number. | Name of Variety. | Yield per acre at the several Experimental Farms. Season of 1898. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| 1 | Holborn Abundance | 393 | 48 | 222 | 12 | 308 | .. | 479 | 36 | 532 | 24 | 387 | 12 |
| 2 | Early White Prize | 369 | 36 | 253 | .. | 385 | .. | 618 | 12 | 454 | 40 | 416 | 5 |
| 3 | Late Puritan | 358 | 36 | 303 | 36 | 579 | 20 | 655 | 36 | 428 | 46 | 465 | 10 |
| 4 | Rose No. 9 | 354 | 12 | 288 | 12 | 458 | 20 | 492 | 48 | 454 | 40 | 409 | 38 |
| 5 | Empire State | 345 | 24 | 145 | 48 | 487 | 40 | 622 | 36 | 476 | 40 | 415 | 37 |
| 6 | American Wonder | 338 | 48 | 242 | .. | 550 | .. | 611 | 36 | 550 | .. | 458 | 28 |
| 7 | State of Maine | 325 | 36 | 283 | 48 | 601 | 20 | 539 | .. | 443 | .. | 438 | 32 |
| 8 | Rural Blush | 325 | 36 | 327 | 48 | 476 | 40 | 433 | 24 | 583 | 24 | 429 | 22 |
| 9 | Northern Spy | 325 | 36 | 145 | 48 | 366 | 40 | 605 | 24 | 491 | 20 | 386 | 57 |
| 10 | Seedling No. 7 | 321 | 12 | 297 | .. | 682 | .. | 506 | 4 | 542 | 40 | 469 | 47 |
| 11 | Rural No. 2 | 319 | .. | 259 | 36 | 608 | 40 | 396 | .. | 443 | .. | 405 | 15 |
| 12 | Carman No. 1 | 316 | 48 | 356 | 24 | 531 | 40 | 589 | 36 | 309 | .. | 420 | 41 |
| 13 | Polaris | 316 | 48 | 365 | 12 | 476 | 40 | 706 | 12 | 308 | .. | 434 | 34 |
| 14 | Green Mountain | 314 | 36 | 257 | 24 | 586 | 40 | 561 | 15 | 475 | .. | 438 | 59 |
| 15 | Seattle | 308 | .. | 387 | 12 | 381 | 20 | 517 | 48 | 296 | 16 | 378 | 7 |
| 16 | Peerless Junior | 308 | .. | 292 | 36 | 432 | 40 | 525 | 16 | 484 | .. | 408 | 30 |
| 17 | Clay Rose | 303 | 36 | 314 | 38 | 572 | .. | 541 | 32 | 513 | 20 | 449 | 1 |
| 18 | Lee's Favourite | 303 | 36 | 352 | .. | 220 | .. | 510 | 24 | 407 | 44 | 358 | 44 |
| 19 | Pride of the Table | 299 | 12 | 325 | 36 | 377 | 40 | 517 | 18 | 385 | 44 | 381 | 6 |
| 20 | Flemish Beauty | 299 | 12 | 356 | 24 | 403 | 20 | 442 | 12 | 406 | 14 | 381 | 28 |
| 21 | Rochester Rose | 297 | .. | 275 | .. | 462 | .. | 611 | 20 | 378 | 24 | 404 | 44 |
| 22 | Burnaby Seedling | 294 | 48 | 169 | 24 | 520 | 40 | 591 | 30 | 409 | 12 | 397 | 6 |
| 23 | Money Maker | 294 | 48 | 360 | 48 | 506 | .. | 468 | 30 | 484 | .. | 422 | 49 |
| 24 | American Giant | 290 | 24 | 349 | 48 | 506 | .. | 646 | 48 | 586 | 40 | 475 | 56 |
| 25 | Record | 288 | 12 | 165 | .. | 414 | 20 | 259 | 36 | 476 | 40 | 320 | 45 |
| 26 | Dreer's Standard | 288 | 12 | 303 | 36 | 623 | 20 | 514 | 10 | 557 | 20 | 457 | 19 |
| 27 | Early Ohio | 286 | .. | 198 | .. | 154 | .. | 584 | 27 | 369 | 36 | 318 | 24 |
| 28 | Irish Cobbler | 279 | 24 | 332 | 12 | 418 | .. | 517 | .. | 381 | 20 | 385 | 35 |
| 29 | Reeve's Rose | 279 | 24 | 310 | 12 | 410 | 40 | 636 | 40 | 486 | 56 | 424 | 46 |
| 30 | Earliest of All | 279 | 24 | 327 | 48 | 315 | 20 | 466 | 24 | 447 | 20 | 367 | 15 |
| 31 | Sir Walter Raleigh | 277 | 12 | 187 | .. | 476 | 40 | 396 | .. | 532 | 24 | 373 | 51 |
| 32 | New Queen | 277 | 12 | 297 | .. | 256 | 40 | 558 | 40 | 406 | 14 | 359 | 9 |
| 33 | Early Norther | 277 | 12 | 200 | 12 | 440 | .. | 470 | 48 | 564 | 40 | 390 | 34 |
| 34 | New Variety No. 1 | 275 | .. | 316 | 48 | 440 | .. | 660 | .. | 616 | .. | 461 | 33 |
| 35 | Bill Nye | 275 | .. | 358 | 36 | 297 | .. | 467 | 56 | 532 | 24 | 386 | 11 |
| 36 | Maggie Murphy | 272 | 48 | 288 | 12 | 403 | 20 | 453 | 12 | 572 | .. | 397 | 54 |
| 37 | Daisy | 270 | 36 | 194 | 48 | 168 | 40 | 633 | 36 | 542 | 40 | 362 | 4 |
| 38 | Vick's Extra Early | 270 | 36 | 246 | 24 | 381 | 20 | 594 | 6 | 484 | .. | 395 | 17 |
| 39 | Bovee | 266 | 12 | 294 | 48 | 330 | .. | 673 | 12 | 445 | 50 | 402 | .. |
| 40 | Carman No. 3 | 266 | 12 | 316 | 48 | 484 | .. | 591 | 48 | 443 | 30 | 420 | 27 |
| 41 | Queen of the Valley | 266 | 12 | 279 | 24 | 553 | 40 | 547 | 48 | 457 | 36 | 420 | 56 |
| 42 | Everett | 264 | .. | 270 | 36 | 249 | 20 | 649 | .. | 444 | 20 | 375 | 27 |
| 43 | Troy Seedling | 264 | .. | 253 | .. | 403 | 20 | 499 | 14 | 572 | .. | 398 | 18 |
| 44 | Good News | 264 | .. | 165 | .. | 443 | 40 | 499 | 24 | 325 | 36 | 339 | 32 |
| 45 | Delaware | 264 | .. | 354 | 12 | 572 | .. | 528 | .. | 363 | 44 | 416 | 23 |
| 46 | Dakota Red | 261 | 48 | 180 | 24 | 425 | 20 | 552 | 12 | 623 | 20 | 408 | 36 |
| 47 | Honeoye Rose | 261 | 48 | 286 | .. | 55 | .. | 512 | 6 | 371 | 4 | 297 | 11 |
| 48 | Early Six Weeks | 261 | 48 | 312 | 24 | 293 | 20 | 325 | 30 | 395 | 46 | 317 | 45 |
| 49 | Irish Daisy | 259 | 36 | 448 | 48 | 498 | 40 | 598 | 28 | 484 | .. | 457 | 54 |
| 50 | Early Rose | 259 | 36 | 211 | 12 | 315 | 20 | 495 | .. | 464 | 56 | 349 | 12 |
| 51 | Early Thorburn | 259 | 36 | 237 | 36 | 407 | .. | 389 | 24 | 387 | 12 | 336 | 9 |

## UNIFORM TEST PLOTS OF POTATOES—*Continued.*

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms. Season of 1898. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| 52 | Seedling No. 230 | 259 | 36 | 332 | 12 | 381 | 20 | 584 | 20 | 528 | .. | 417 | 5 |
| 53 | Crown Jewel | 259 | 36 | 217 | 48 | 190 | 40 | 486 | 12 | 491 | 20 | 329 | 7 |
| 54 | Pearce's Extra Early | 257 | 24 | 149 | 36 | 91 | 40 | * | | 431 | 42 | 232 | 35 |
| 55 | General Gordon | 257 | 24 | 195 | 48 | 440 | .. | 512 | 36 | 528 | .. | 386 | 45 |
| 56 | Beauty of Hebron | 255 | 12 | 248 | 36 | 168 | 40 | 618 | .. | 476 | 40 | 353 | 25 |
| 57 | White Beauty | 255 | 12 | 179 | 36 | 392 | 20 | 488 | 24 | 440 | .. | 351 | 6 |
| 58 | Monroe County | 255 | 12 | 224 | 24 | 513 | 20 | 574 | 12 | 466 | 24 | 406 | 42 |
| 59 | Cambridge Russet | 253 | .. | 294 | 48 | 300 | 40 | 473 | .. | 395 | 40 | 343 | 25 |
| 60 | Vanier | 253 | .. | 299 | 12 | 528 | .. | 498 | 8 | 308 | .. | 377 | 16 |
| 61 | Early Sunrise | 250 | 48 | 151 | 48 | 205 | 20 | 677 | 36 | 475 | 12 | 352 | 8 |
| 62 | Early Harvest | 250 | 48 | 178 | 12 | 220 | .. | 490 | .. | 322 | 40 | 292 | 20 |
| 63 | Satisfaction | 250 | 48 | 156 | 12 | 370 | 20 | 477 | 24 | 366 | 40 | 324 | 16 |
| 64 | Clarke's No. 1 | 248 | 36 | 198 | .. | 498 | 40 | 631 | 24 | 462 | .. | 407 | 44 |
| 65 | Chicago Market | 248 | 36 | 248 | 36 | 586 | 40 | * | | 425 | 50 | 377 | 25 |
| 66 | Ideal | 248 | 36 | 288 | 12 | 381 | 20 | 382 | 48 | 548 | 30 | 369 | 53 |
| 67 | Wonder of the World | 248 | 36 | 203 | 24 | 447 | 20 | 605 | .. | 445 | .. | 389 | 52 |
| 68 | Columbus | 244 | 12 | 244 | 12 | 539 | .. | 503 | 12 | 368 | 8 | 379 | 44 |
| 69 | Hopeful | 239 | 48 | 297 | .. | 498 | 40 | 398 | . | 315 | 20 | 349 | 45 |
| 70 | Ohio Junior | 239 | 48 | 187 | .. | 242 | .. | 383 | 20 | 436 | 6 | 297 | 38 |
| 71 | Early Puritan | 239 | 48 | 239 | 48 | 436 | 20 | 582 | 4 | 395 | 40 | 378 | 44 |
| 72 | Uncle Sam | 239 | 48 | 160 | 36 | 414 | 20 | 563 | 12 | 586 | 40 | 392 | 55 |
| 73 | Lizzie's Pride | 237 | 36 | 358 | 36 | 410 | 40 | 619 | 8 | 476 | 40 | 420 | 32 |
| 74 | Reading Giant | 235 | 24 | 398 | 12 | 396 | .. | 558 | 23 | 463 | 28 | 410 | 17 |
| 75 | Brown's Rot Proof | 233 | 12 | 224 | 24 | 590 | 20 | * | | 425 | 50 | 368 | 26 |
| 76 | Maule's Thoroughbred | 228 | 48 | 316 | 48 | 480 | 20 | 468 | 36 | 441 | 28 | 387 | 12 |
| 77 | Stourbridge Glory | 228 | 48 | 165 | .. | 388 | 40 | 537 | .. | 431 | 42 | 350 | 14 |
| 78 | Early Gem | 224 | 56 | 321 | 12 | 242 | .. | 437 | .. | 410 | 40 | 327 | 9 |
| 79 | Quaker City | 222 | 12 | 330 | .. | 586 | 40 | 528 | 10 | 366 | 40 | 406 | 44 |
| 80 | Table King | 222 | 12 | 198 | .. | 381 | 20 | 415 | 48 | 293 | 10 | 302 | 6 |
| 81 | Orphans | 220 | .. | 231 | .. | 278 | 40 | 353 | 28 | 388 | 40 | 294 | 21 |
| 82 | Sharpe's Seedling | 220 | .. | 211 | 12 | 278 | 40 | 538 | 28 | 528 | .. | 155 | 4 |
| 83 | Pearce's Prize Winner | 215 | 36 | 301 | 24 | 374 | .. | * | | 438 | 32 | 332 | 23 |
| 84 | World's Fair | 215 | 36 | 154 | .. | 476 | 40 | 554 | 24 | 313 | 50 | 342 | 54 |
| 85 | Prize Taker | 211 | 12 | 149 | 36 | 212 | 40 | 589 | 32 | 310 | 56 | 294 | 47 |
| 86 | Hale's Champion | 211 | 12 | 402 | 26 | 212 | 40 | 464 | 48 | 300 | 40 | 318 | 21 |
| 87 | I. X. L | 209 | .. | 250 | 48 | 612 | 20 | 512 | 22 | 394 | 12 | 396 | 56 |
| 88 | Freeman | 209 | .. | 160 | 36 | 465 | 40 | 545 | 36 | 319 | 44 | 340 | 7 |
| 89 | Victor Rose | 206 | 48 | 145 | 48 | 308 | .. | 556 | 37 | 365 | 12 | 316 | 29 |
| 90 | Pride of the Market | 202 | 24 | 288 | 12 | 476 | 40 | 531 | 24 | 445 | 50 | 388 | 54 |
| 91 | Great Divide | 198 | .. | 360 | 48 | 550 | .. | 594 | .. | 375 | 28 | 415 | 39 |
| 92 | McKenzie | 198 | .. | 387 | 12 | 407 | .. | 554 | 10 | 447 | 20 | 393 | 44 |
| 93 | Burpee's Extra Early | 193 | 36 | 281 | 36 | 124 | 40 | 398 | 12 | 444 | 20 | 288 | 28 |
| 94 | Algoma No. 1 | 180 | 24 | 217 | 48 | 330 | .. | 488 | 20 | 350 | 32 | 313 | 24 |
| 95 | Harbinger | 167 | 12 | 264 | .. | 344 | 40 | 565 | 14 | 337 | 20 | 335 | 41 |
| 96 | London | 167 | 12 | 270 | 36 | 198 | .. | 496 | 52 | 462 | .. | 318 | 56 |
| 97 | Brownell's Winner | 165 | .. | 182 | 36 | 385 | .. | 631 | 24 | 513 | .. | 375 | 24 |
| 98 | Houlton Rose | 156 | 12 | 145 | 48 | 297 | .. | 612 | 8 | 583 | 24 | 358 | 54 |
| 99 | Fillbasket | 154 | .. | 132 | .. | 190 | 40 | 324 | 12 | 256 | 40 | 211 | 42 |
| 100 | Seedling No. 214 | 154 | .. | 202 | 24 | 216 | 20 | 514 | 48 | 401 | 50 | 295 | 52 |
| 101 | Charles Downing | 151 | 48 | 303 | 36 | 440 | .. | 618 | 10 | 580 | 48 | 418 | 52 |
| 102 | Lightning Express | 151 | 48 | 228 | 48 | 205 | 20 | 558 | 48 | 441 | 28 | 317 | 14 |
| 103 | Russell's Seedling | 149 | 36 | 301 | 24 | 337 | 20 | 497 | 12 | 344 | 40 | 326 | 2 |
| 104 | King of the Roses | 145 | 12 | 312 | 24 | 253 | .. | 582 | 23 | 290 | 24 | 316 | 40 |

* Nos. 54, 65, 75 and 83 were omitted at the Indian Head Farm, owing to the seed not arriving in time to plant with the other sorts.

The twelve varieties of potatoes which have produced the largest crops at the several experimental farms are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holborn Abundance | 393 | 48 | 7. State of Maine | 325 | 36 |
| 2. Early White Prize | 369 | 36 | 8. Rural Blush | 325 | 36 |
| 3. Late Puritan | 358 | 36 | 9. Northern Spy | 325 | 36 |
| 4. Rose No. 9 | 354 | 12 | 10. Seedling No. 7 | 321 | 12 |
| 5. Empire State | 345 | 24 | 11. Rural No. 2 | 319 | .. |
| 6. American Wonder | 338 | 48 | 12. Carman No. 1 | 316 | 48 |

An average crop of 341 bushels 11 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Irish Daisy | 448 | 48 | 7. Money Maker | 360 | 48 |
| 2. Hale's Champion | 402 | 26 | 8. Great Divide | 360 | 48 |
| 3. Reading Giant | 398 | 12 | 9. Lizzie's Pride | 358 | 36 |
| 4. Seattle | 387 | 12 | 10. Bill Nye | 358 | 36 |
| 5. McKenzie | 387 | 12 | 11. Flemish Beauty | 356 | 24 |
| 6. Polaris | 365 | 12 | 12. Carman No. 1 | 356 | 24 |

An average crop of 378 bushels 23 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling No. 7 | 682 | 7 | 7. Chicago Market | 586 | 40 |
| 2. Dreer's Standard | 623 | 20 | 8. Green Mountain | 586 | 40 |
| 3. I. X. L | 612 | 20 | 9. Quaker City | 586 | 40 |
| 4. Rural No. 2 | 608 | 40 | 10. Late Puritan | 579 | 20 |
| 5. State of Maine | 601 | 20 | 11. Clay Rose | 572 | .. |
| 6. Brown's Rot Proof | 590 | 20 | 12. Delaware | 572 | .. |

An average crop of 600 bushels 7 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Polaris | 706 | 12 | 7. American Giant | 646 | 48 |
| 2. Early Sunrise | 677 | 36 | 8. Reeves' Rose | 636 | 40 |
| 3. Bovee | 673 | 12 | 9. Daisy | 633 | 36 |
| 4. New Variety No. 1 | 660 | .. | 10. Clarke's No. 1 | 631 | 24 |
| 5. Late Puritan | 655 | 36 | 11. Brownell's Winner | 631 | 24 |
| 6. Everett | 649 | .. | 12. Empire State | 622 | 36 |

An average crop of 652 bushels per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Dakota Red | 623 | 20 | 7. Charles Downing | 580 | 48 |
| 2. New Variety No. 1 | 616 | .. | 8. Maggie Murphy | 572 | .. |
| 3. Uncle Sam | 586 | 40 | 9. Troy Seedling | 572 | .. |
| 4. American Giant | 586 | 40 | 10. Early Norther | 564 | 40 |
| 5. Rural Blush | 583 | 24 | 11. Dreer's Standard | 557 | 20 |
| 6. Houlton Rose | 583 | 24 | 12. American Wonder | 550 | .. |

An average crop of 581 bushels 21 lbs. per acre.

The twelve varieties which have produced the largest crops in 1898, taking the average of the results obtained at all the experimental farms are:

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Giant | 475 | 56 | 7. Dreer's Standard | 457 | 19 |
| 2. Seedling No. 7 | 469 | 47 | 8. Clay Rose | 449 | 1 |
| 3. Late Puritan | 465 | 10 | 9. Green Mountain | 438 | 59 |
| 4. New Variety No. 1 | 461 | 33 | 10. State of Maine | 438 | 32 |
| 5. American Wonder | 458 | 28 | 11. Polaris | 434 | 34 |
| 6. Irish Daisy | 457 | 54 | 12. Rural Blush | 429 | 22 |

An average crop of 453 bushels 3 lbs. per acre.

The average crop of all the varieties of potatoes tested, at each of the experimental farms, was as follows: At Ottawa, 255 bushels 35 lbs. per acre; Nappan, 261 bushels 15 lbs.; Brandon, 394 bushels 18 lbs.; Indian Head, 503 bushels 16 lbs. and at Agassiz 422 bushels 36 lbs. The average return given by the whole of the varieties at all the farms was 367 bushels 24 lbs. per acre.

## AVERAGE CROPS FOR THE PAST THREE AND FOUR YEARS.

The results of experimental tests of varieties of grain, to gain information as to their relative productiveness and usefulness, are much more reliable as a guide to the selection of the best sorts, when the average experience of several years can be given. For the past four years these test plots have been conducted, under conditions as nearly uniform as it has been possible to secure. The average of the crops obtained during this period, is herewith presented.

### FOUR YEARS' EXPERIENCE WITH VARIETIES OF OATS.

The twelve varieties of oats which have averaged the heaviest crops at the several experimental farms during the past four years, are the following:—

#### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 70 | 21 | 7. Golden Giant | 65 | 7 |
| 2. Golden Beauty | 69 | 7 | 8. White Schonen | 64 | 15 |
| 3. American Triumph | 67 | 19 | 9. White Russian | 64 | 2 |
| 4. Columbus | 67 | 15 | 10. Joanette | 64 | 1 |
| 5. Abundance | 66 | 37 | 11. Early Golden Prolific | 63 | 23 |
| 6. Improved Ligowo | 65 | 30 | 12. American Beauty | 62 | 32 |

An average crop of 66 bushels per acre.

#### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

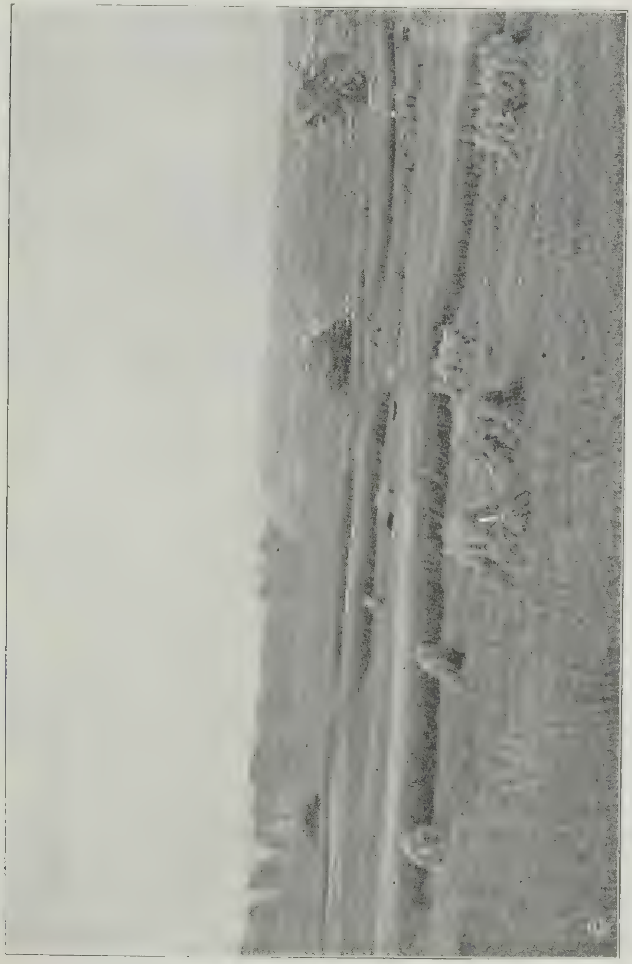
| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Russian | 66 | 21 | 7. California Prolific Black | 62 | 12 |
| 2. Wallis | 65 | 2 | 8. Abyssinia | 62 | 4 |
| 3. Columbus | 64 | 19 | 9. White Schonen | 61 | 26 |
| 4. Banner | 63 | 19 | 10. American Beauty | 61 | 16 |
| 5. Oderbrush | 63 | 13 | 11. Golden Beauty | 60 | 25 |
| 6. Early Blossom | 62 | 17 | 12. Lincoln | 60 | 25 |

An average crop of 62 bushels 31 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Per acre. Lbs. |
|---|---|---|
| 1. American Beauty | 92 | 19 |
| 2. Banner | 90 | 5 |
| 3. Holstein Prolific | 81 | 23 |
| 4. Early Golden Prolific | 81 | 1 |
| 5. White Schonen | 80 | 27 |
| 6. Golden Giant | 79 | 29 |
| 7. Bavarian | 79 | 26 |
| 8. California Prolific Black | 77 | 12 |
| 9. Rosedale | 77 | 7 |
| 10. Golden Beauty | 75 | 12 |
| 11. Columbus | 74 | 1 |
| 12. Joanette | 73 | 25 |

An average crop of 86 bushels 25 lbs. per acre.



Experimental Plots of Oats at the Central Experimental Farm, Ottawa, Ont.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Per acre. Lbs. |
|---|---|---|
| 1. Columbus | 88 | 18 |
| 2. American Beauty | 85 | 15 |
| 3. Holstein Prolific | 84 | 26 |
| 4. Abundance | 82 | 4 |
| 5. Golden Beauty | 80 | 7 |
| 6. Abyssinia | 80 | 5 |
| 7. Early Golden Prolific | 80 | 2 |
| 8. White Schonen | 79 | 34 |
| 9. Wide Awake | 79 | 34 |
| 10. Early Archangel | 79 | 14 |
| 11. Bavarian | 77 | 32 |
| 12. Banner | 77 | 1 |

An average crop of 81 bushels 10 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Bavarian | 60 | 22 | 7. Early Golden Prolific | 55 | 33 |
| 2. Lincoln | 60 | 6 | 8. Early Archangel | 55 | 30 |
| 3. Early Gothland | 59 | 27 | 9. Cream Egyptian | 55 | 5 |
| 4. Early Blossom | 56 | 17 | 10. Holstein Prolific | 55 | 3 |
| 5. Banner | 56 | 7 | 11. American Beauty | 54 | 33 |
| 6. Columbus | 56 | 7 | 12. Early Maine | 54 | 16 |

An average crop of 56 bushels 26 lbs. per acre.

The twelve varieties of oats which have produced the largest average crops for the past four years on all the experimental farms, and hence may perhaps be regarded as worthy of being placed at the head of the list for general cultivation are the following:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 71 | 17 | 7. White Schonen | 65 | 29 |
| 2. American Beauty | 71 | 16 | 8. Early Golden Prolific | 65 | 27 |
| 3. Columbus | 70 | 5 | 9. Wallis | 65 | 16 |
| 4. Golden Beauty | 67 | 17 | 10. Abundance | 65 | 9 |
| 5. Bavarian | 66 | 33 | 11. Golden Giant | 64 | 19 |
| 6. Holstein Prolific | 66 | 18 | 12. White Russian | 64 | 11 |

An average crop of 67 bushels 4 lbs. per acre.

The Improved Ligowo, which is also a very promising oat, averaged 64 bushels 6 lbs. per acre, within 5 lbs. per acre of the White Russian.

## FOUR YEARS' EXPERIENCE WITH VARIETIES OF BARLEY.

### TWO-ROWED BARLEY.

The six varieties of two-rowed barley which have averaged the heaviest crops at the several experimental farms during the past four years, are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver | 42 | 9 | 4. Canadian Thorpe | 40 | 15 |
| 2. Danish Chevalier | 40 | 32 | 5. Sidney | 39 | 38 |
| 3. Bolton | 40 | 15 | 6. Newton | 39 | 27 |

An average crop of 40 bushels 22 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 36 | 12 | 4. Beaver | 34 | 3 |
| 2. Danish Chevalier | 35 | 25 | 5. Bolton | 33 | 51 |
| 3. Newton | 34 | 18 | 6. Prize Prolific | 33 | 16 |

An average crop of 34 bushels 29 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 51 | 9 | 4. Newton | 43 | 36 |
| 2. Sidney | 48 | .. | 5. Beaver | 42 | 46 |
| 3. Thanet | 44 | 28 | 6. Prize Prolific | 39 | 47 |

An average crop of 45 bushels 4 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 58 | 31 | 4. Prize Prolific | 53 | 34 |
| 2. Danish Chevalier | 56 | 22 | 5. Newton | 52 | 6 |
| 3. Canadian Thorpe | 54 | 29 | 6. Beaver | 52 | 4 |

An average crop of 54 bushels 29 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 37 | 39 | 4. Beaver | 35 | 12 |
| 2. Kinver Chevalier | 36 | 45 | 5. Canadian Thorpe | 34 | 10 |
| 3. Danish Chevalier | 36 | 2 | 6. Prize Prolific | 32 | 39 |

An average crop of 35 bushels 24 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest crops for the past four years, taking the average of the results obtained on all the experimental farms, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 36 | 26 | 4. Canadian Thorpe | 34 | 10 |
| 2. Danish Chevalier | 34 | 18 | 5. Newton | 33 | 26 |
| 3. Beaver | 34 | 17 | 6. Prize Prolific | 32 | 14 |

An average crop of 34 bushels 10 lbs. per acre.

## SIX-ROWED BARLEY.

The six varieties of six-rowed barley which have averaged the heaviest crops at the several experimental farms for the past four years are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 57 | 12 | 4. Pioneer | 51 | 39 |
| 2. Mensury | 55 | 42 | 5. Stella | 48 | 19 |
| 3. Royal | 53 | 26 | 6. Trooper | 48 | 17 |

An average crop of 52 bushels 26 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 48 | 45 | 4. Surprise | 41 | 42 |
| 2. Trooper | 43 | 1 | 5. Pioneer | 41 | 32 |
| 3. Oderbruch | 42 | 44 | 6. Vanguard | 40 | 30 |

An average crop of 43 bushels 8 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Par acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Common | 56 | 7 | 4. Nugent | 51 | 32 |
| 2. Trooper | 55 | 2 | 5. Surprise | 50 | 15 |
| 3. Mensury | 54 | 30 | 6. Stella | 49 | 23 |

An average crop of 52 bushels 42 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rennie's Improved | 60 | 30 | 4. Mensury | 57 | 24 |
| 2. Odessa | 59 | 28 | 5. Baxter | 55 | 40 |
| 3. Common | 57 | 28 | 6. Trooper | 55 | 30 |

An average crop of 57 bushels 38 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Oderbruch | 33 | 34 | 4. Common | 32 | 21 |
| 2. Mensury | 33 | 1 | 5. Royal | 32 | 12 |
| 3. Odessa | 32 | 44 | 6. Trooper | 31 | 1 |

An average crop of 32 bushels 27 lbs. per acre.

The six varieties of six-rowed barley which have produced the largest crops for the past four years, taking the average of the results obtained on all the experimental farms are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 49 | 47 | 4. Common | 45 | 24 |
| 2. Odessa | 47 | 20 | 5. Royal | 45 | 2 |
| 3. Trooper | 46 | 29 | 6. Oderbruch | 44 | 44 |

An average crop of 46 bushels 27 lbs. per acre.

## FOUR YEARS' EXPERIENCE WITH VARIETIES OF SPRING WHEAT.

The twelve varieties of spring wheat which have averaged the heaviest crops, at the several experimental farms during the past four years, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 26 | 3 | 7. Stanley | 22 | 41 |
| 2. Colorado | 23 | 59 | 8. Pringle's Champlain | 22 | 33 |
| 3. Goose | 23 | 51 | 9. Huron | 22 | 27 |
| 4. Wellman's Fife | 23 | 46 | 10. Progress | 21 | 41 |
| 5. Rio Grande | 23 | 37 | 11. Vernon | 21 | 41 |
| 6. Monarch | 23 | 24 | 12. Advance | 21 | 20 |

An average crop of 23 bushels 5 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wellman's Fife | 32 | 44 | 7. Goose | 29 | 50 |
| 2. Stanley | 31 | 5 | 8. White Russian | 29 | 5 |
| 3. White Connell | 30 | 55 | 9. Rio Grande | 29 | .. |
| 4. Preston | 30 | 45 | 10. Old Red River | 28 | 55 |
| 5. Red Fern | 30 | 35 | 11. Advance | 28 | 35 |
| 6. Huron | 30 | 10 | 12. Admiral | 27 | 20 |

An average crop of 29 bushels 5 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Fife | 39 | 5 | 7. White Connell | 34 | 57 |
| 2. Goose | 38 | 7 | 8. Pringle's Champlain | 34 | 43 |
| 3. Red Fife | 36 | 50 | 9. Rio Grande | 34 | 28 |
| 4. Preston | 36 | 41 | 10. Old Red River | 33 | 35 |
| 5. Monarch | 36 | 25 | 11. White Russian | 33 | 2 |
| 6. Crown | 35 | 27 | 12. Wellman's Fife | 32 | 25 |

An average crop of 35 bushels 29 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Fife | 42 | 7 | 7. Percy | 40 | 57 |
| 2. Emporium | 42 | 3 | 8. Crown | 40 | 52 |
| 3. Beaudry | 41 | 48 | 9. Wellman's Fife | 40 | 50 |
| 4. Preston | 41 | 25 | 10. Red Fern | 40 | 10 |
| 5. Huron | 41 | 22 | 11. Stanley | 39 | 10 |
| 6. White Fife | 41 | 2 | 12. White Connell | 39 | 2 |

An average crop of 40 bushels 53 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Fife | 26 | 31 | 7. Old Red River | 25 | 25 |
| 2. Preston | 26 | 30 | 8. Wellman's Fife | 25 | 15 |
| 3. White Connell | 26 | 20 | 9. Alpha | 25 | 1 |
| 4. Red Fife | 26 | 11 | 10. Monarch | 24 | 45 |
| 5. Herisson Bearded | 26 | 2 | 11. Campbell's White Chaff | 24 | 45 |
| 6. Rio Grande | 25 | 50 | 12. Admiral | 24 | 35 |

An average crop of 25 bushels 35 lbs. per acre.

The twelve varieties of spring wheat which have produced the largest crops, taking the average of the results obtained on all the experimental farms for the past four years, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 32 | 17 | 7. White Connell | 30 | 19 |
| 2. Wellman's Fife | 31 | .. | 8. Rio Grande | 30 | 1 |
| 3. Monarch | 30 | 58 | 9. Goose | 29 | 58 |
| 4. Percy | 30 | 24 | 10. Red Fern | 29 | 17 |
| 5. Red Fife | 30 | 23 | 11. Old Red River | 29 | 17 |
| 6. White Fife | 30 | 20 | 12. Advance | 29 | 8 |

An average crop of 30 bushels 17 lbs. per acre.

The cross-bred variety Stanley came within 5 lbs. of Advance, having averaged 29 bushels 3 lbs. for the four years.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF PEASE.

The twelve varieties of pease which have averaged the heaviest crops at the several experimental farms for the past three years, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur | 41 | 22 | 7. Canadian Beauty | 35 | 30 |
| 2. Macoun | 39 | 10 | 8. Bedford | 35 | 27 |
| 3. Kent | 37 | 23 | 9. Creeper | 35 | 22 |
| 4. Agnes | 36 | 26 | 10. Duke | 35 | 17 |
| 5. Mackay | 36 | 15 | 11. Crown | 35 | 15 |
| 6. Black-eyed Marrowfat | 36 | 12 | 12. Paragon | 34 | 47 |

An average crop of 36 bushels 32 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 47 | .. | 7. Large White Marrowfat | 33 | 50 |
| 2. Centennial | 36 | 40 | 8. Carleton | 33 | 10 |
| 3. Pride | 36 | 33 | 9. Bedford | 32 | 10 |
| 4. Black-eyed Marrowfat | 36 | 26 | 10. Prince | 32 | 10 |
| 5. New Potter | 33 | 53 | 11. Prince Albert | 31 | 33 |
| 6. Creeper | 33 | 50 | 12. Paragon | 30 | 50 |

An average crop of 34 bushels 50 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pride | 52 | 35 | 7. Crown | 44 | 32 |
| 2. Mummy | 48 | 32 | 8. Black-eyed Marrowfat | 44 | .. |
| 3. New Potter | 48 | 30 | 9. Trilby | 43 | 46 |
| 4. Carleton | 46 | 33 | 10. Prince | 41 | 26 |
| 5. Kent | 45 | 40 | 11. Agnes | 40 | 53 |
| 6. Mackay | 44 | 53 | 12. Prince Albert | 40 | 13 |

An average crop of 45 bushels 8 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Paragon | 43 | 23 | 7. Golden Vine | 37 | 22 |
| 2. Trilby | 42 | 53 | 8. Centennial | 37 | 20 |
| 3. Carleton | 40 | 30 | 9. New Potter | 36 | 20 |
| 4. Crown | 39 | 26 | 10. Pride | 36 | .. |
| 5. Duke | 38 | 36 | 11. Mackay | 35 | 33 |
| 6. Prince | 38 | 3 | 12. Creeper | 34 | 46 |

An average crop of 38 bushels 12 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur | 28 | 53 | 7. New Potter | 23 | 32 |
| 2. Creeper | 25 | 53 | 8. Centennial | 22 | 45 |
| 3. Prince Albert | 25 | 46 | 9. Kent | 22 | 13 |
| 4. Carleton | 24 | 50 | 10. Paragon | 22 | 7 |
| 5. Macoun | 24 | 46 | 11. Crown | 21 | 51 |
| 6. Multiplier | 23 | 55 | 12. Golden Vine | 21 | 27 |

An average crop of 23 bushels 59 lbs. per acre.

The twelve varieties of pease which have produced the largest crops, taking the average of the results obtained on all the experimental farms, for the past three years, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 37 | 36 | 7. Centennial | 33 | 47 |
| 2. Carleton | 35 | 49 | 8. Paragon | 33 | 40 |
| 3. Pride | 35 | 16 | 9. Creeper | 33 | 26 |
| 4. New Potter | 34 | 57 | 10. Trilby | 33 | 16 |
| 5. Prince Albert | 33 | 49 | 11. Duke | 33 | 14 |
| 6. Arthur | 33 | 47 | 12. Kent | 33 | 11 |

An average crop of 34 bushels 19 lbs. per acre.

## THREE AND FOUR YEARS' EXPERIENCE WITH VARIETIES OF INDIAN CORN.

(Where not otherwise marked, the figures given are the results of four years' tests.)

The six varieties of Indian Corn which have averaged the heaviest crops at the several experimental farms during the past three or four years, are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Prolific Ensilage...... | 26 | 91 | 4. Red Cob Ensilage.......... | 24 | 184 |
| 2. Thoroughbred White Flint.... | 25 | 1,179 | 5. Pride of the North (3 yrs.)... | 21 | 805 |
| 3. Selected Leaming............ | 25 | 189 | 6. Champion White Pearl...... | 21 | 236 |

An average crop of 23 tons 1,780 lbs. per acre.

Experimental Plots of Indian Corn at the Central Experimental Farm, Ottawa, Ont.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoroughbred White Flint.... | 17 | 155 | 4. Angel of Midnight.......... | 14 | 1,466 |
| 2. Sanford.......... ........ | 15 | 435 | 5. Compton's Early .......... | 14 | 1,035 |
| 3. Selected Leaming............ | 15 | 67 | 6. Canada White Flint......... | 14 | 627 |

An average crop of 15 tons 298 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Angel of Midnight | 22 | 1,567 | 4. Pride of the North (3 yrs.) | 19 | 1,233 |
| 2. Thoroughbred White Flint | 20 | 1,272 | 5. Longfellow | 19 | 445 |
| 3. Red Cob Ensilage | 19 | 1,622 | 6. Selected Leaming | 18 | 1,986 |

An average crop of 20 tons 354 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Prolific Ensilage | 11 | 1,835 | 4. Selected Leaming | 11 | 465 |
| 2. Sanford | 11 | 1,242 | 5. Pride of the North (3 yrs.) | 11 | 197 |
| 3. Red Cob Ensilage | 11 | 936 | 6. Compton's Early | 11 | 187 |

An average crop of 11 tons 810 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Leaming | 25 | 1,106 | 4. King of the Earliest (3 yrs.) | 21 | 370 |
| 2. Red Cob Ensilage | 22 | 1,851 | 5. Angel of Midnight | 19 | 830 |
| 3. Giant Prolific Ensilage | 21 | 460 | 6. Thoroughbred White Flint | 18 | 1,013 |

An average crop of 21 tons 938 lbs. per acre.

The six varieties of Indian Corn which have produced the largest crops for the past three or four years, taking the average of the results obtained on all the experimental farms, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Leaming | 19 | 362 | 4. Giant Prolific Ensilage | 17 | 1,463 |
| 2. Red Cob Ensilage | 18 | 1,038 | 5. Pride of the North (3 yrs.) | 16 | 1,475 |
| 3. Thoroughbred White Flint | 18 | 1,025 | 6. Angel of Midnight | 16 | 1,407 |

An average crop of 17 tons 1,795 lbs. per acre.

## THREE AND FOUR YEARS' EXPERIENCE WITH VARIETIES OF TURNIPS.

(Where not otherwise marked the figures given are the results of four years' tests).

The six varieties of turnips which have averaged the heaviest crops at the several experimental farms during the past three or four years, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top | 38 | 505 | 4. Carter's Elephant | 35 | 1,170 |
| 2. Perfection Swede (3 yrs.) | 36 | 875 | 5. Giant King | 35 | 1,115 |
| 3. Hartley's Bronze | 35 | 1,170 | 6. Mammoth Clyde (3 yrs.) | 34 | 1,813 |

An average crop of 36 tons 108 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Perfection Swede (3 yrs.) | 32 | 1,438 | 4. Carter's Elephant | 31 | 589 |
| 2. Hartley's Bronze | 32 | 308 | 5. Skirving's | 30 | 1,798 |
| 3. Selected Purple Top | 31 | 1,965 | 6. Mammoth Clyde (3 yrs.) | 30 | 386 |

An average crop of 31 tons 1,081 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top.......... | 31 | 1,668 | 4. Hartley's Bronze............ | 27 | 1,044 |
| 2. Perfection Swede (3 yrs.)...... | 29 | 828 | 5. Sutton's Champion (3 yrs.)... | 27 | 824 |
| 3. Champion Purple Top........ | 28 | 1,204 | 6. Prize Winner (3 yrs.)........ | 27 | 614 |

An average crop of 28 tons 1,363 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze............. | 19 | 1,556 | 4. Selected Purple Top......... | 18 | 608 |
| 2. Champion Purple Top........ | 18 | 1,620 | 5. Skirving's...................... | 18 | 344 |
| 3. Perfection Swede (3 yrs.)...... | 18 | 872 | 6. East Lothian.................. | 18 | 126 |

An average crop of 18 tons 1,187 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Jumbo ........................ | 45 | 1,245 | 4. East Lothian.................. | 40 | 1,282 |
| 2. Selected Purple Top.......... | 43 | 1,266 | 5. Prize Winner (3 yrs.)........ | 38 | 1,195 |
| 3. Giant King .................... | 41 | 1,445 | 6. Perfection Swede (3 yrs.)..... | 35 | 1,837 |

An average crop of 41 tons 45 lbs. per acre.

The six varieties of turnips which have produced the largest crops, taking the average of the results obtained on all the experimental farms, for the past three or four years, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top ......... | 32 | 1,602 | 4. Hartley's Bronze............. | 29 | 1,660 |
| 2. Perfection Swede............... | 30 | 1,170 | 5. East Lothian.................. | 29 | 961 |
| 3. Jumbo............................ | 29 | 1,805 | 6. Giant King..................... | 29 | 151 |

An average crop of 30 tons 558 lbs. per acre.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF MANGELS.

The six varieties of mangels which have averaged the heaviest crops, at the several experimental farms for the past three years, are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post...................... | 39 | 1,273 | 4. Giant Yellow Globe.......... | 33 | 935 |
| 2. Giant Yellow Intermediate .. | 36 | 1,608 | 5. Canadian Giant.............. | 31 | 1,130 |
| 3. Mamm. Long Red.............. | 34 | 1,190 | 6. Yellow Intermediate........ | 31 | 175 |

An average crop of 34 tons 1,052 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Globe.......... | 32 | 601 | 4. Gate Post...................... | 27 | 908 |
| 2. Giant Yellow Intermediate... | 31 | 325 | 5. Mamm. Long Red.......... | 26 | 1,968 |
| 3. Yellow Intermediate......... | 30 | 1,160 | 6. Prize Mamm. Long Red .... | 26 | 1,736 |

An average crop of 29 tons 449 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post | 44 | 880 | 4. Canadian Giant | 39 | 1,477 |
| 2. Giant Yellow Intermediate | 40 | 1,664 | 5. Prize Mamm. Long Red | 39 | 1,112 |
| 3. Yellow Intermediate | 40 | 696 | 6. Giant Yellow Globe | 38 | 32 |

An average crop of 40 tons 977 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 20 | 436 | 4. Gate Post | 18 | 1,921 |
| 2. Giant Yellow Globe | 19 | 808 | 5. Canadian Giant | 18 | 1,180 |
| 3. Giant Yellow Intermediate | 18 | 1,990 | 6. Golden Fleshed Tankard | 18 | 569 |

An average crop of 19 tons 151 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B. C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. Long Red | 33 | 352 | 4. Mamm. Oval Shaped | 30 | 104 |
| 2. Gate Post | 32 | 1,501 | 5. Giant Yellow Intermediate | 29 | 1,129 |
| 3. Golden Fleshed Tankard | 30 | 670 | 6. Canadian Giant | 29 | 197 |

An average crop of 30 tons 1,659 lbs. per acre.

The six varieties of mangels which have produced the largest crops, taking the average of the results obtained at all the experimental farms, for the past three years, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post | 31 | 1,296 | 4. Giant Yellow Globe | 29 | 961 |
| 2. Giant Yellow Intermediate | 31 | 943 | 5. Mamm. Long Red | 29 | 139 |
| 3. Yellow Intermediate | 30 | 1,616 | 6. Canadian Giant | 28 | 1,796 |

An average crop of 30 tons 458 lbs. per acre.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF CARROTS.

The six varieties of carrots which have given the heaviest crops, at the several experimental farms for the past three years, are the following.

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate | 26 | 1,020 | 4. Iverson's Champion | 23 | 1,740 |
| 2. Improved Short White | 24 | 766 | 5. Half Long White | 23 | 1,208 |
| 3. Giant White Vosges | 24 | 691 | 6. White Belgian | 23 | 53 |

An average crop of 24 tons 579 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate | 17 | 1,821 | 4. Improved Short White | 17 | 505 |
| 2. Iverson's Champion | 17 | 1,373 | 5. Half Long White | 17 | 398 |
| 3. Giant White Vosges | 17 | 520 | 6. Half Long Chantenay | 16 | 945 |

An average crop of 17 tons 594 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Gem | 14 | 1,186 | 4. Half Long White | 13 | 1,426 |
| 2. Iverson's Champion | 14 | 526 | 5. White Belgian | 13 | 33 |
| 3. Giant White Vosges | 13 | 1,500 | 6. Mamm. White Intermediate | 13 | 33 |

An average crop of 13 tons 1,451 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White | 9 | 40 | 4. Improved Short White | 8 | 632 |
| 2. Half Long Chantenay | 8 | 1,772 | 5. Iverson's Champion | 8 | 366 |
| 3. Mamm. White Intermediate | 8 | 1,028 | 6. White Belgian | 8 | 192 |

An average crop of 8 tons 1,005 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White | 34 | 166 | 4. Giant White Vosges | 30 | 1,531 |
| 2. Yellow Intermediate | 33 | 195 | 5. White Belgian | 29 | 30 |
| 3. Half Long White | 30 | 1,567 | 6. Iverson's Champion | 28 | 1,239 |

An average crop of 31 tons 121 lbs. per acre.

The six varieties of carrots which have produced the largest crops, taking the average of the results obtained on all the experimental farms, for the past three years, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White | 19 | 263 | 4. Mamm. White Intermediate | 18 | 1,409 |
| 2. Half Long White | 18 | 1,727 | 5. Iverson's Champion | 18 | 1,048 |
| 3. Giant White Vosges | 18 | 1,559 | 6. White Belgian | 17 | 1,321 |

An average crop of 18 tons 1,221 lbs. per acre.

## FOUR YEARS' EXPERIENCE WITH VARIETIES OF POTATOES.

The twelve varieties of potatoes which have averaged the heaviest crops, at the several experimental farms during the past four years, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Northern Spy | 386 | 18 | 7. Everett | 312 | 24 |
| 2. Late Puritan | 364 | 16 | 8. Empire State | 312 | 20 |
| 3. Holborn Abundance | 346 | 18 | 9. Rochester Rose | 311 | 57 |
| 4. American Wonder | 335 | 46 | 10. Early White Prize | 308 | 46 |
| 5. Irish Daisy | 334 | 12 | 11. American Giant | 301 | 19 |
| 6. Seedling 230 | 313 | 30 | 12. State of Maine | 301 | 15 |

An average crop of 327 bushels 21 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling 230 | 435 | 4 | 7. Holborn Abundance | 380 | 20 |
| 2. McKenzie | 407 | 24 | 8. Rochester Rose | 379 | 10 |
| 3. Seattle | 402 | 27 | 9. Pearce's Prize Winner | 378 | 41 |
| 4. Irish Daisy | 395 | 14 | 10. Lee's Favourite | 364 | 22 |
| 5. Carman No. 1 | 384 | 31 | 11. Early Puritan | 362 | 22 |
| 6. Reading Giant | 382 | 34 | 12. Dreer's Standard | 358 | 49 |

An average crop of 385 bushels 55 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Irish Daisy | 419 | 13 | 7. Carman No. 1 | 386 | 52 |
| 2. Pearce's Prize Winner | 418 | — | 8. New Variety No 1 | 386 | 13 |
| 3. Chicago Market | 407 | 40 | 9. Clarke's No. 1 | 383 | 10 |
| 4. Late Puritan | 402 | 25 | 10. Pride of the Market | 382 | 15 |
| 5. Great Divide | 390 | 30 | 11. Early Norther | 380 | 25 |
| 6. Dreer's Standard | 390 | 30 | 12. Delaware | 380 | 6 |

An average crop of 393 bushels 56 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Lee's Favourite | 462 | 4 | 7. Monroe County | 383 | 40 |
| 2. New Variety No. 1 | 420 | 12 | 8. Queen of the Valley | 382 | 48 |
| 3. Northern Spy | 405 | 36 | 9. Rochester Rose | 376 | 34 |
| 4. London | 392 | 21 | 10. American Wonder | 372 | 54 |
| 5. Seedling 230 | 390 | 28 | 11. Brownell's Winner | 370 | 45 |
| 6. Early White Prize | 385 | 9 | 12. World's Fair | 370 | 20 |

An average crop of 392 bushels 44 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling No. 7 | 468 | 21 | 7. Reading Giant | 354 | 4 |
| 2 Brownell's Winner | 407 | 30 | 8. Troy Seedling | 351 | 11 |
| 3. Clay Rose | 404 | 19 | 9. Late Puritan | 346 | 37 |
| 4. Dakota Red | 386 | 51 | 10. Irish Daisy | 345 | 32 |
| 5. World's Fair | 384 | 15 | 11. American Wonder | 334 | 46 |
| 6. Seedling 230 | 367 | 53 | 12. American Giant | 333 | 4 |

An average crop of 373 bushels 42 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops, taking the average of the results obtained on all the experimental farms, for the past four years, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Irish Daisy | 366 | 44 | 7. Lee's Favourite | 338 | 13 |
| 2. Seedling 230 | 361 | 45 | 8. Empire State | 336 | 52 |
| 3. Late Puritan | 356 | 54 | 9. State of Maine | 335 | 56 |
| 4. American Wonder | 345 | 46 | 10. McKenzie | 335 | 17 |
| 5. Reading Giant | 340 | 35 | 11. Clarke's No. 1 | 334 | 17 |
| 6. New Variety No. 1 | 338 | 16 | 12. Queen of the Valley | 333 | 41 |

An average crop of 343 bushels 41 lbs. per acre.

## SUMMARY.

The particulars presented in this bulletin, show the importance of choosing the most prolific and vigorous growing varieties for seed. They also afford further proof that the tendency to great productiveness in certain sorts, is to a large extent fixed and permanent. As an example the twelve varieties of oats which are listed in this bulletin, as having given the largest average crops, at all the experimental farms for the past four years, includes ten of those given last year as the best for three years. Further in comparing these two lists of the best twelve sorts of oats, for each experimental farm, we find this year at Ottawa ten out of the former twelve, at Nappan ten of the twelve, at Brandon eleven of the twelve, at Indian Head ten of the twelve and at Agassiz nine of the twelve. A careful scrutiny of the lists of the other sorts of grain will afford further evidence along this line.

The variations between the largest and smallest crops, in the uniform test plots on the Central Experimental Farm while not quite so marked in 1898 as they were in 1897, are still very large. In the oats the crops range from 89 bushels 14 lbs. to 42 bushels 12 lbs. ; in the two-rowed barley from 55 bushels 20 lbs. to 31 bushels 10 lbs. ; in the six-rowed barley from 58 bushels 16 lbs. to 33 bushels 16 lbs. ; in the spring wheat from 31 bushels 15 lbs. to 15 bushels, and in the pease from 46 bushels 50 lbs. to 20 bushels.

These facts should induce farmers every where to pay more attention to the selection of the most promising sorts for seed. Any of those varieties which are among the twelve which have given the best average crops for the past four years may be sown with the confident expectation of a good crop, provided the season is fairly favourable, and the general use of these more productive sorts for seed, would soon raise the average yield of the Dominion several bushels, which would add some millions of dollars yearly, to the receipts of the farming community in Canada.

DEPARTMENT OF AGRICULTURE

CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

# EXPERIMENTS IN PORK PRODUCTION


BY

J. H. GRISDALE, B. Agr.

*Agriculturist, Central Experimental Farm*


Bacon Hogs.

BULLETIN No. 33

JUNE, 1899


Published by direction of the Hon. Sydney A. Fisher, Minister of Agriculture.

Piggery at the Central Experimental Farm.

To the Honourable
The Minister of Agriculture,

SIR,—I have the honour to submit for your approval Bulletin No. 33 of the Experimental Farm series on "Experiments in Pork Production". This has been prepared under my direction by Mr. J. H. Grisdale, the Agriculturist of the Central Experimental Farm.

In this bulletin all the experiments which have been conducted in the feeding and fattening of swine at the Central Experimental Farm for the past eight years have been tabulated and summarized so as to present in a condensed form the whole of the information which has been gained by the investigations made regarding pork production during that time. Useful conclusions are also drawn from the results of this work.

Information is also given in this bulletin in reference to the care of the breeding stock and the management and feeding of young pigs. It is hoped that the facts presented in this publication, based on the experience gained from many carefully conducted experiments, will prove useful to the farmers of Canada and aid in advancing the pork industry which has made such rapid progress during the past few years.

I have the honour to be

Your obedient servant,

WM. SAUNDERS,
*Director, Experimental Farms.*

OTTAWA, 20th June, 1899.

# EXPERIMENTS IN PORK PRODUCTION.

BY J. H. GRISDALE, B. Agr.,

AGRICULTURIST, CENTRAL EXPERIMENTAL FARM.

Pigs were introduced upon the Central Experimental Farm in 1890. The breeds invested in were Berkshires, Improved Large Yorkshires and Essex. Since that time, Chester Whites, Poland-Chinas and Tamworths have been secured, while the Essex is no longer bred here. Owing to limited accommodation not many animals of each breed are kept, usually two sows and a boar.

Experimental work in breeding for hogs of a certain type has been carried on. As no other part of this bulletin will deal with the characteristics of the breeds and their crosses, it might be well here to say a few words upon this work.

The Yorkshire-Tamworth cross has proven to be a most excellent one. It is eminently fitted to suit the market of the present day.

The Yorkshire-Berkshire cross has also proven to be a growthy pig and well fitted for general use.

The Berkshire-Tamworth cross seems to be an excellent pig where quick growth and early maturity are especially desired.

Where these breeds have been crossed with the Chester White, the Poland-China or the Essex, the get, in most cases, has proven to be of a rather short, blocky type. They have, as a rule, exhibited a strong tendency to lay on fat rather than develop muscular tissue.

## Care of Breeding Stock.

A few general statements might be made in this connection which would prove of some use. To begin with, the boar should be kept in fairly good flesh, care being taken to avoid fatness and some plan adopted to insure considerable exercise.

Brood sows likewise should be kept in fairly good flesh. The best method of keeping these animals is upon pasture in summer and in a large pen in winter feeding them upon roots very largely, with bran, shorts or oats added. As farrowing time approaches, care should be taken by the attendant to get on friendly terms with them, so that there may be no undue excitement at that critical juncture, should any assistance be necessary.

To prevent the sow crushing her young, a board, about eight inches wide placed flat horizontally about eight inches from the floor will prove of great value. A small enclosure in one corner of the pen, kept dry and well littered will also prove of great service in protecting the little ones as they will naturally go there to sleep.

The sow should be fed a plentiful ration of bran, shorts or oats, and milk while suckling her young.

The young pigs should be early taught to eat. This may be done by placing a small trough in the above-mentioned enclosure. For a few days a small supply of warm new milk might be placed in it, and later skim-milk warmed to blood heat. In two or three weeks or even less some shorts or oatmeal might be added to the milk. Great care must be taken to keep the trough scrupulously clean. It should be washed thoroughly every day.

If the young are dropped in winter, it is well to give them a few sods to tear up in their pen. The roots and earth appear to serve the important ends of supplying vegetable and mineral matter so necessary to the health and development of young animals.

By pursuing this or some similar method of feeding the young they will, at from seven to nine weeks, be weaned. Care should be taken at this time to reduce the sow's ration, especially the bran, shorts, oats or milk.

Much of the trouble experienced in raising pigs arises from the feed and care given the sow. If these are what they should be, no sickness is likely to occur in the young. Do not feed the same mixture for long to either sow or young. Variety in feed aids digestion.

## Fattening Swine.

Experiments have been conducted with all the common cereals fed in different ways and in different mixtures to ascertain the amount of each required to make a pound of pork, when fed separately and when fed with other cereals. Extensive experiments with skim-milk have also been conducted and a number of tests have been made of feeds not commonly used by farmers. Below will be found a summary of the various experiments with a few comments by the compiler.

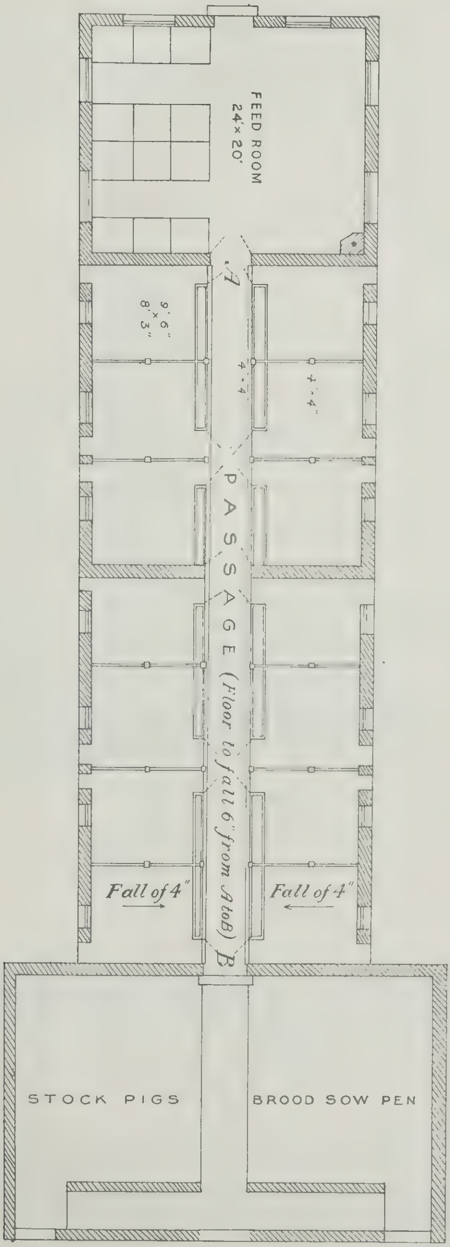
The work summarized was conducted from 1890 to 1895, inclusive, by Prof. J. W. Robertson, who during that time was agriculturist of the Central Farm; from 1896 to 1898, inclusive, by Dr. Wm. Saunders, Director, and this year's work has been conducted under my supervision. No further reference will be made to the experiments, but where quotations are made from the reports the year will be mentioned. Most of the data submitted have been collected from different years and classified under subjects rather than according to the date when obtained.

Below is a diagram of the piggery on the Central Experimental Farm. This piggery was planned by Prof. J. W. Robertson in 1890. On another page will be found an engraving showing the building and part of the yard as they now appear.

### Plan I: Piggery.

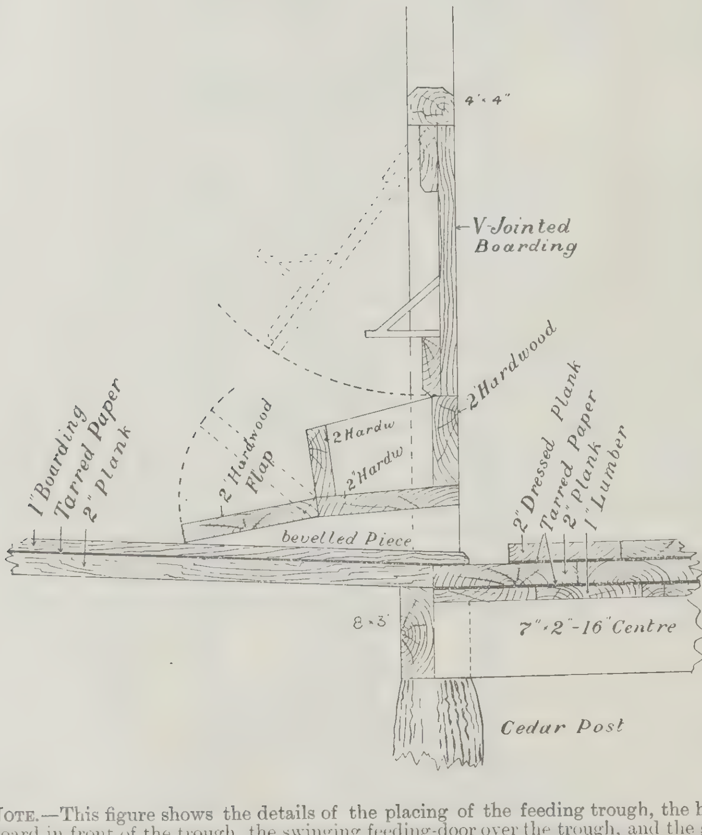
The following figures illustrate the plan of the pens :

I



PLAN II: PIGGERY

II




NOTE.—This figure shows the details of the placing of the feeding trough, the hinged foot-board in front of the trough, the swinging feeding-door over the trough, and the gutter which receives all the liquid from each Pen. The fall in the floor towards the feeding-trough permits the swine to lie on a dry bed at the back of each Pen.

## Comparison of Breeds as to economy as Feeders.

The following report is taken, with slight changes, from the report of 1894:—

### *Comparison of Breeds and Breeding.*

The following tables show the quantities of feed consumed per pound of increase in live weight, by swine of different breeds or breeding during different feeding tests.

Table I. shows the quantities of frosted wheat, ground and soaked in cold water for an average period of eighteen hours, consumed by swine of different breeding per pound of increase in live weight. They were fed for a period of twelve weeks.

Table I.

| No. of Swine. | Breeding. | Date of Birth. | Average of live weight per head. | | Feed consumed per lb. of increase. |
|---|---|---|---|---|---|
| | | 1892. | Oct. 3. | Dec. 26. | |
| | | | lbs. | lbs. | lbs. |
| 3 Crossbreds.. | Berkshire sire and Poland-China dam | May 14. | 109 | 210 | 5·03 |
| 4 Grades...... | Improved Large Yorkshire sire and Berkshire Grade dam ........... | June 13. | 94 | 186 | 5·03 |
| 2 Crossbreds.. | Improved Large Yorkshire sire and Berkshire dam .................. | May 1. | 128 | 213 | 5·56 |
| 3 Purebreds... | Improved Large Yorkshire.......... | Aug. 4. | 91 | 157 | 5·87 |

Table II. shows the quantity of a mixture of equal parts by weight of barley and frosted wheat, both ground and soaked in cold water for an average period of thirty hours, plus pulped carrots, consumed by swine of different breeding per pound of increase in live weight. They were fed for a period of twelve weeks.

Table II.

| No. of Swine. | Breeding. | Date of Birth. | Average of live weight per head. | | Feed consumed per lb. of increase. | |
|---|---|---|---|---|---|---|
| | | 1892. | Feb. 7 or 14. | May 2 or 9. | Grain | Carrots. |
| | | | lbs. | lbs. | lbs. | lbs. |
| 6 Crossbreds.. | Improved Large Yorkshire sire and Essex dam............ | Sept. 23. | 70 | 134 | 3·77 | 0·76 |
| 3 Purebreds... | Berkshire .................. | " 24. | 117 | 186 | 4·17 | 0·76 |
| 4 Crossbreds.. | Improved Large Yorkshire sire and Poland-China dam..... | Aug. 3. | 119 | 189 | 4·42 | 0·89 |
| 4 Purebreds... | Tamworth .................. | " 30. | 114 | 172 | 4·74 | 0·86 |
| 4 " .. | Improved Large Yorkshire.. | 2, May 17; 2, Aug. 4 | 189 | 236 | 5·83 | 1·06 |

Table III. shows the quantity of a mixture composed of equal parts by measure of barley, rye, frosted wheat (all ground) and wheat bran, soaked in cold water for an average period of 8 or 18 hours, consumed per pound of increase in live weight by swine of different breeding. Some of them were fed for a period of fifteen weeks, and some of them for a period of twelve weeks.

TABLE III.

| No. of Swine. | Breeding. | Date of Birth. | Average of live weight per head. | | Feed consumed per lb. of increase. |
|---|---|---|---|---|---|
| | | 1893. | Aug. 23. | Dec. 6. | |
| | | | lbs. | lbs. | lbs |
| 5 Crossbreds.. | Improved Large Yorkshire sire and Berkshire dam.... .... ....... | June 9. | 42 | 86 | 3·62 |
| 5 " .. | Berkshire sire and Improved Large Yorkshire dam ................ | " 6. | 49 | 108 | 3·72 |
| 5 " .. | Essex sire and Improved Large Yorkshire dam ...... . ........ .... | May 31. | 45 | 98 | 3·73 |
| 2 " .. | Berkshire sire and Tamworth dam... | " 7. | 94 | 173 | 4·03 |
| 5 " .. | Berkshire sire and Poland China dam | Apl. 27. | 83 | 161 | 4·11 |
| 5 " .. | Essex sire and Improved Large Yorkshire dam.... .................. | May 31. | 41 | 83 | 4·27 |
| | | | Sept. 6. | Nov. 29. | |
| 4 Grades...... | Tamworth sire and Berkshire grade dam..... ......... .. .. ......... | July 3. | 52 | 113 | 3·24 |
| 5 Purebreds... | Improved Large Yorkshire ......... | June 15. | 48 | 82 | 3·90 |

Table IV. shows the quantity of a mixture of equal parts by measure of barley, rye, frosted wheat (all ground) and wheat bran, soaked in cold water for an average period of eighteen hours, plus 3 pounds of skim-milk per head per day, consumed per pound of increase in live weight by swine of different breeding. Some of them were fed for a period of 8 weeks, and some for a period of 12 weeks.

TABLE IV.

| No. of Swine. | Breeding. | Date of Birth. | Average of live weight per head. | | Feed consumed per lb. of increase. | |
|---|---|---|---|---|---|---|
| | | 1893. | Dec. 6. | | Meal | Milk. |
| | | | lbs. | lbs. | lbs. | bs. |
| 5 Crossbreds.. | Improved Large Yorkshire sire, and Berkshire dam... | June 9.. | 86 | Jan. 31, 150 | 2.52 | 2·56 |
| 5 Purebreds... | Improved Large Yorkshire.. | " 15.. | 82 | Feb. 28, 191 | 2·64 | 2·31 |
| 5 Crossbreds.. | Essex sire and Improv'd Large Yorkshire dam .. ..... .. | May 31. | 98 | Jan. 31, 169 | 2·88 | 2·32 |
| 4 Grades...... | Tamworth sire and Berkshire grade dam.............. | July 3.. | 117 | " 31, 202 | 3·10 | 1·95 |
| 5 Crossbreds.. | Berkshire sire, and Improved Large Yorkshire dam..... | June 6.. | 108 | Feb. 28, 223 | 3·09 | 2·17 |
| 5 " .. | Essex sire, and Improved Large Yorkshire dam...... | May 31. | 83 | " 28, 192 | 3·23 | 2·53 |
| 2 " .. | Berkshire sire, and Tamworth dam. .................... | " 7.. | 173 | " 28, 225 | 3·77 | 2·45 |

*Conclusions.* From these *four series of tests* it appears that :—

1. The breeding of the swine which gave the *largest increase* per pound of feed consumed was different in each of the four tests, viz. :—

Table I. { Crossbreds, *Berkshire* sire and *Poland-China* dam ;
Grades, *Improved Large Yorkshire* and *Berkshire Grade* dam ;
" II., Crossbreds, *Improved Large Yorkshire* sire and *Essex* dam ;
" III., Grades, *Tamworth* sire and *Berkshire Grade* dam ;
" IV., Crossbreds, *Improved Large Yorkshire* sire and *Berkshire* dam;

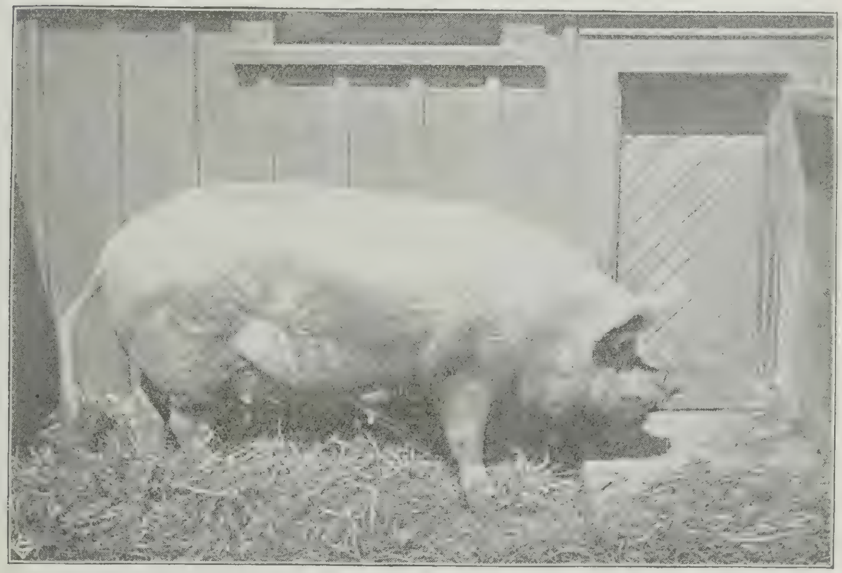
2. The breeding of the swine which gave the *least increase* per pound of feed consumed was :—

Table I., Purebreds, *Improved Large Yorkshire ;*
" II., " " "
" III., Crossbreds, *Essex* sire and *Improved Large Yorkshire* dam ;
" IV., " *Berkshire* sire and *Tamworth* dam ;

3. There was *no constant* or appreciable *superiority* in the breeds and breeding tested, in respect to the quantity of feed consumed per pound of increase in live weight ;

4. The difference in the thriftiness, or power to increase in live weight per pound of feed consumed, was greater between *different animals* in the same litter than between breeds or breeding as such, in different litters ;

5. On the whole, for fattening purposes *crossbred* swine and *grades* gave better results than purebreds.



Improved Large Yorkshire Sow.

Experiments with different kinds of Grain fed in different ways.

A large number of experiments have been conducted with the view of determining the relative and actual feeding values of some of the feeding stuffs available to the average feeder. No positive values may be assigned to any food as a pork producer, but the average of a large number of experiments, some of them involving a good many animals of different weights and breeding, may be taken as a fairly good indication of the values of the grains or feeds tested.

To economize space, as many results as possible have been placed in the subjoined table.

The numbers are prefixed for reference merely.

TABLE V.

| Experiments. | Feed. | How Prepared. | No. of Swine. | Average weight at start. | Average weight at finish. | Average net gain. | Number of Days fed. | Average daily gain. | Average amount feed eaten. | Average amount feed for 1 lb gain. | Per cent dressed weight. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | lbs. | lbs. | lbs. | | lbs. | lbs. | lbs. | p. c. |
| 1 | Oats.......... | Whole, soaked 54 hrs.. | 4 | 97 | 170 | 73 | 84 | ·87 | 307 | 4·21 | 74·67 |
| | Skim-milk ... | ........ | | | | | | | 252 | 3·45 | .... |
| 2 | Oats......... | Ground, soaked 54 hrs. | 4 | 54 | 184 | 130 | 126 | 1·03 | 424 | 3·26 | 74·87 |
| | Skim-milk .... | ........ | | | | | | | 756 | 5·81 | .... |
| 3 | Barley.. .... | Ground, soaked 54 hrs. | 4 | 73 | 184 | 111 | 112 | 1·00 | 483 | 4·35 | 74·56 |
| 4 | Barley........ | Whole, soaked 54 hrs.. | 4 | 99 | 199 | 100 | 84 | 1·19 | 364 | 3·64 | 74·19 |
| | Skim-milk ... | ........ | | | | | | | 252 | 2·52 | .... |
| 5 | Corn ......... | Ground, soaked 30 hrs. | 4 | 74 | 172 | 98 | 112 | ·87 | 408 | 4·16 | 76·89 |
| 6 | Corn ......... | Whole, soaked 54 hrs.. | 3 | 72 | 190 | 118 | 91 | 1·30 | 343 | 2·90 | 81·74 |
| | Skim-milk ... | ........ | | | | | | | 273 | 2·31 | .... |
| 7 | Pease......... | Whole, soaked 54 hrs.. | 4 | 100 | 207 | 107 | 84 | 1·27 | 356 | 3·33 | 75·43 |
| | Skim-milk ... | ........ | | | | | | | 252 | 2·35 | ...... |
| 8 | Pease......... | Ground, soaked 54 hrs. | 4 | 62 | 224 | 162 | 126 | 1·28 | 446 | 2·76 | 76·07 |
| | Skim-milk.... | ........ | | | | | | | 756 | 4·68 | ..... |
| 9 | Oats and pease | Ground, soaked 54 hrs. | 3 | 61 | 226 | 165 | 126 | 1·31 | 503 | 3·00 | 75·15 |
| | Skim-milk .. | ........ | | | | | | | 756 | 4·51 | ...... |
| 10 | Oats, barley and pease. | Whole, soaked 54 hrs.. | 3 | 71 | 176 | 105 | 91 | 1·15 | 306 | 3·20 | 79·08 |
| | Skim-milk .... | ........ | | | | | | | 273 | 2·60 | .... |
| 11 | Shorts ...... | Soaked 36 hrs......... | 4 | 72 | 156 | 84 | 112 | ·75 | 372 | 4·42 | 77·73 |
| 12 | Meal......... | Soaked 30 hrs......... | 5 | 60 | 175 | 115 | 84 | 1·37 | 349 | 3.10 | 77·79 |
| | Skim-milk .... | ........ | | | | | | | 504 | 4·35 | . |
| 13 | Meal. ...... | Soaked 30 hrs......... | 5 | 61 | 154 | 93 | 84 | 1·11 | 179 | 1·92 | 74·40 |
| | Skim-milk.... | ........ | | | | | | | 504 | 5·40 | ...... |
| | Sunflowers.... | Soaked ....... | | | | | | | 197 | 2·11 | .... |
| 14 | Potatoes .... | Raw.................. | 3 | 56 | 153 | 97 | 140 | ·70 | 133 | 1·37 | 76·58 |
| | Meal.. ...... | Soaked 30 hrs......... | | | | | | | 365 | 3·72 | ..... |
| | Skim-milk.... | ........ | | | | | | | 105 | 1·08 | .... |
| 15 | Potatoes ..... | Cooked.... ......... | 3 | 56 | 171 | 115 | 140 | ·82 | 831 | 7·18 | .. |
| | Meal. ...... | Soaked 30 hrs........ | | | | | | | 177 | 1·52 | ..... |
| | Skim-milk.. . | ........ | | | | | | | 315 | 2·72 | ... |
| 16 | Potatoes ..... | Raw.................. | 3 | 55 | 192 | 137 | 140 | ·98 | 98 | ·71 | 76·99 |
| | " ..... | Cooked. ........ | | | | | | | 332 | 2·41 | .. |
| | Meal......... | Soaked 30 hrs. ....... | | | | | | | 314 | 2·28 | .... |
| | Skim-milk.... | ........ | | | | | | | 210 | 1·52 | ... |
| 17 | Potatoes .. .. | Cooked. .. ........ | 3 | 55 | 195 | 140 | 140 | 1·00 | 712 | 5.06 | ...... |
| | Meal..... ... | ........ | | | | | | | 289 | 2·05 | ..... |
| | Skim-milk.... | ........ | | | | | | | 105 | ·74 | .... |
| 18 | Potatoes ..... | Cooked............... | 3 | 50 | 192 | 142 | 140 | 1·01 | 1,034 | 7·29 | 78·39 |
| | Meal......... | ........ | | | | | | | 140 | ·98 | .... |
| | Skim-milk ... | ........ | | | | | | | 420 | 2·96 | ... |
| 19 | Oats, pease and barley. | Ground, soaked 30 hrs. | 4 | 66 | 190 | 124 | 119 | 1·04 | 467 | 3·76 | ...... |
| 20 | $\frac{3}{4}$ oats, pease and barley. | Ground and soaked.... | 4 | 68 | 137 | 69 | 119 | ·58 | 247 | 3·60 | .... |
| | $\frac{1}{4}$ clover.......... | ........ | | | | | | | 82 | 1·20 | .... |

Meal in each case in the above table means a mixture, equal parts by weight, of barley, rye, wheat (frozen) and bran, the first three being ground.

*Preparation of the Feed.*

It will be observed from a study of experiments 1 and 2, and 7 and 8, that ground grain gives better returns for the amount fed than whole grain. Soaking, while not equivalent to grinding, still adds materially to the value of the feed. On page 27 will be found an experiment where whole grain dry was compared with ground grain dry. It is highly probable that the extra returns from ground grain will more than pay for the cost of grinding. The work in feeding at the Central Experimental Farm would seem to indicate that the most economical method of feed preparation is that of soaking for 24 hours or longer.

*Values of food.*—Experiments with oats fed as the sole grain and skim-milk added would indicate that as a feed for pork production they are, unless comparatively low priced, rather expensive, ground or whole.

Barley also seems to be a rather more expensive feed than the farmer would care to use, but when fed in conjunction with milk it would seem to be profitable.

The value of corn also appears to be very materially influenced by the addition of skim-milk to the ration.

Pease seem to be profitable whether ground or whole. The addition of an extra supply of milk in Experiment 8 over Experiment 7, gave an apparently remarkable increase in gain, but it will be observed that the pease were ground in Experiment 8, and whole in Experiment 7.

The mixture of oats and pease in Experiment 9, and the mixture of oats, pease and barley in Experiment 10, both gave most excellent returns, proving these grains when fed in conjunction, to constitute a good ration. This exemplifies and emphasizes a fact familiar to all good feeders that a mixed ration gives better results than a ration consisting of one variety of feed only.

Shorts fed alone has proven to be a rather expensive ration for this part of Canada.

Sunflower seed was fed with meal (barley, rye, wheat and bran) and skim-milk, but it is not possible to draw any conclusions from this experiment as to the value of this seed as a feed for swine.

It will be observed from a study of Experiments 3 and 4, and 5 and 6, that skim-milk is a very valuable adjunct to any grain ration, but for a fuller discussion of the value of this bye product in the feeding of swine see pages 17 and 18.

Potatoes are frequently available for feeding to pigs, especially small potatoes. Experiments 14 and 16 illustrate in some measure the value of this tuber when fed raw. In Experiment 14 the swine were given all they would eat of raw potatoes for some time, when it was found that they were not making any gain. Meal was then given for the rest of the experiment and the potatoes discontinued. In Experiment 16 raw potatoes were fed for a time and later they were cooked as it was found they did not cause any increase in size. All work here with potatoes seems to indicate that fed raw they are of very little nutritive value, but when cooked they are worth about one quarter as much as mixed grain.

Wheat has been fed alone and so has buckwheat, while sugar beets have formed part of the rations in a number of experiments.

Wheat values may be ascertained from Experiments 1 to 6, page 16.

Buckwheat is shown in table XVIII, page 30.

Sugar Beets as part of a fattening ration is illustrated in Experiment 13, page 25.

Mangels constitute a very important part of our feed for the breeding stock in winter and have been found to be of very great value as a feed for stockers.

Clover when used as part of a ration for fattening swine, has shown itself (one experiment only) to be of very small value, apparently about $\frac{1}{10}$ as valuable as an equal weight of mixed meal.

The influences affecting the relations between the dressed weight of a hog and its live weight are numerous. The average percentage which a large number of dressed carcases constituted of the fasted weight of the living animals was 76·34 per cent.

### *Frozen Wheat Experiments.*

The unsaleable character of some of the wheat which has been occasionally more or less affected by frost in some parts of Manitoba and the Territories led to some experiments being carried on to ascertain the approximate value of this injured grain as a feed for swine. It was fed alone, ground and unground, soaked in either case. It was also fed in conjunction with other cereals and along with skim-milk.

The following table gives in condensed form a summary of this series of experiments.

TABLE VI.

| Experiment. | Feed. | How prepared. | No. of Swine. | Average weight at start. | Average weight at finish. | Average net gain. | Number of days fed. | Average daily gain. | Average amount of feed eaten. | Average amount feed for 1 lb. gain. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | lbs. | lbs. | lbs. | | lbs. | lbs. | lbs. |
| 1 | Wheat......... | Ground and soaked 12 hrs.. | 4 | 185 | 275 | 90 | 77 | 1.17 | 479 | 5·30 |
| 2 | Wheat.... ..... | Whole, soaked 42 hrs..... | 4 | 186 | 273 | 86 | 77 | 1·11 | 570 | 6·59 |
| 3 | Wheat, barley and pease. | Whole, soaked 42 hrs..... | 4 | 187 | 278 | 92 | 77 | 1·19 | 557 | 6·07 |
| 4 | Wheat.......... | Ground and soaked 12 hrs.. | 5 | 61 | 165 | 104 | 120 | 0·87 | 441 | 4·23 |
| 5 | Wheat...........<br>Skim-milk........ | Ground and soaked 12 hours. | 4<br>.... | 104<br>.... | 192<br>.... | 88<br>.... | 56<br>.... | 1·57<br>.... | 233<br>1011 | 2·65<br>12·51 |
| 6 | Wheat........... | Ground and soaked 18 hrs.. | 12 | 103 | 187 | 84 | 84 | 1·00 | 442 | 5·26 |
| 7 | Wheat and barley.<br>Carrots.......... | Ground and soaked 30 hours. | 21 | 117 | 179 | 62 | 84 | 0·73 | 326<br>53 | 4·45<br>0·85 |
| 8 | Barley, rye, wheat and bran. .... | Ground and soaked 12 hours. | 36 | 54 | 108 | 54 | 105 | 0·51 | 207 | 3·85 |
| 9 | Barley, rye wheat and bran........<br>Skim-milk........ | Ground and soaked 12 hours. | 31<br>.... | 108<br>.... | 191<br>.... | 83<br>.... | 83<br>.... | 1·00<br>.... | 268<br>250 | 3·23<br>3·00 |

All wheat fed was more or less injured by frost. It will be observed that the wheat when fed whole and soaked gave rather poorer results than when fed ground and soaked. The comparatively large amount of wheat required for a pound of increase in Experiments 1, 2 and 3 exemplifies very clearly the disadvantage of feeding swine after a weight of 175 to 200 pounds has been attained. This is seen very clearly when we compare lots 2 and 3 with lots 4 and 8. In lot 2, where swine weighing 186 pounds to begin with were fed, an average of 6·59 lbs. was required to produce one pound of pork, while in lot 4, where the pigs weighed 61 lbs. to begin with, only 4·23 lbs. feed was required for the same increase. Of course it will be observed that in lot 2 the wheat was fed whole while it was ground in lot 4, the difference in the amounts of grain required, however, (2·36 lbs.) is much too great to be accounted for in this way.

A comparison of Experiments 4 and 5 shows the value of skim-milk to be about $\frac{1}{7}$ of the frozen wheat, pound for pound.

In comparing Experiments 8 and 9 however, it will be seen that skim-milk is apparently worth $\frac{1}{5}$ as much as the mixture of barley, rye, wheat and bran. This is explained by the smaller proportion of skim-milk in the ration. (See page 20.)

Experiments 8 and 9 exemplify the importance of feeding a mixed ration as a means of economizing feed.

*Experiments in feeding Skim-milk.*

The value of skim-milk as a feed for pork production has always been well known and the following experiments were devised for the purpose of giving some exact data which might be used as a guide to the feeder rather than for the purpose of settling some disputed question or establishing some doubtful feed on better grounds. Some of the experiments summarized in the following table were conducted with the sole purpose of determining the value of this bye product, while others have been introduced as illustrating to a greater or less extent the value of this feed. The very great value of this substance must not be measured by its chemical composition solely; but its peculiar, apparently stimulating action upon the growth of animals must be considered. The following data are accordingly submitted.

TABLE VII.

| Experiment. | Feed. | How Prepared. | No. of Swine. | Average weight at start. | Average weight at finish. | Average net gain. | Number of days fed. | Average daily gain. | Average amount feed eaten. | Average amount feed for 1 lb. gain. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | lbs. | lbs. | lbs. | | lbs. | lbs. | lbs. |
| 1 | Meal. ............ | Soaked 30 hours.. ....... | 3 | 117 | 230 | 113 | 112 | 1·00 | 483 | 4·27 |
| 2 | Meal (half quantity fed in expt. 1). | Soaked 30 hours ......... | 4 | 103 | 246 | 143 | 112 | 1·27 | 181 | 1·26 |
| | Skim-milk........ | ...... .. ......... ..... | .... | .... | .. | .... | .... | .... | 3,631 | 25·39 |
| 3 | Wheat shorts...... | Soaked 30 hours......... | 5 | 179 | 261 | 82 | 56 | 1·46 | 509 | 3·80 |
| | Skim-milk ...... | ... .... .... ..... | ... | .... | ... | ... | .... | .. | 536 | 4·10 |
| 4 | Meal: pease, wheat and rye. | Ground and soaked 18 hrs. | 2 | 123 | 196 | 73 | 56 | 1·30 | 250 | 3·43 |
| 5 | Meal, as in 4 (but only $\frac{3}{4}$ amount). | Soaked 18 hours.......... | 2 | 120 | 206 | 86 | 56 | 1·54 | 188 | 2·17 |
| | Skim-milk........ | .. .. ... ..... .. .... | ... | .... | .... | .... | .... | .... | 960 | 11·10 |
| 6 | Meal, as in 4 (but only $\frac{1}{2}$ amount). | Soaked 18 hours ......... | 2 | 116 | 202 | 86 | 56 | 1·54 | 125 | 1·45 |
| | Skim-milk ....... | ....... ...... .... .... | ... | .... | ... | .... | ... | .... | 1,332 | 15·49 |
| 7 | Corn ............ | Ground and soaked 30 hrs. | 4 | 74 | 172 | 98 | 112 | ·87 | 408 | 4·16 |
| 8 | Corn......... .. . | Whole, soaked 54 hours .. | 3 | 72 | 190 | 118 | 91 | 1·30 | 343 | 2·90 |
| | Skim-milk.... . | ... ....... .... ... | ... | ... | .... | .. | .... | .... | 273 | 2·31 |
| 9 | Pease............ | Whole, soaked 54 hours.. | 4 | 100 | 207 | 107 | 84 | 1·27 | 356 | 3·33 |
| | Skim milk ...... | .... ............... ..... | ... | .... | .... | .... | .... | .... | 252 | 2·35 |
| 10 | Barley........... | Ground, soaked 54 hours.. | 4 | 73 | 184 | 111 | 112 | 1·00 | 483 | 4·35 |
| 11 | Barley.... ...... | Whole, soaked 54 hours.. | 4 | 99 | 199 | 100 | 84 | 1·19 | 364 | 3·64 |
| | Skim-milk........ | ........... .. ......... | .... | .... | .... | .... | .... | ... | 252 | 2·52 |
| 12 | Pease, barley and rye. | Whole, soaked 48 hours.. | 5 | 69 | 156 | 87 | 119 | ·73 | 386 | 4·45 |
| 13 | Pease, barley and rye. | Whole, soaked 48 hours.. | 5 | 69 | 204 | 135 | 119 | 1·13 | 330 | 2·46 |
| | Skim-milk........ | ........... .. . .... | ... | .... | ... | .... | .... | .... | 1,869 | 13·92 |
| 14 | Pease, barley and rye. | Ground and soaked 12 hours. | 5 | 69 | 173 | 104 | 119 | ·87 | 455 | 4·36 |
| 15 | Pease, barley and rye. | Ground and soaked..... | 4 | 76 | 210 | 134 | 119 | 1·12 | 464 | 3·46 |
| | Skim-milk... .... | ... ..... ......... .. | .... | .... | ... | .... | .... | ... | 645 | 4·81 |

*Conclusions.*—From these tests to gain information as to the feeding value of skim-milk it appears that :—

1. When swine were fed with meal, barley, rye and wheat, alone 4·27 lbs. were required to give 1 lb. gain, but when swine were fed upon similar meal, half the quantity being given, and all the milk they could consume only 1·26 lbs. of meal were required for 1 lb. gain and 25·39 lbs. skim-milk. One pound meal would thus be worth 8·43 lbs. milk.

2. A mixture of pease, wheat and rye gave 1 lb. pork for each 3·43 lbs. fed. (Exp. 4.) For comparison a similar number of swine (Exp. 5) were given three-quarters the quantity of the same meal and all the skim-milk they would drink. It was then found that 2·17 lbs. meal and 11·10

lbs. skim-milk gave 1 lb. increase in weight. According to these data skim-milk may be said to bear the relation of 8·82 lbs. to one of meal.

3. In Exps. 7 and 8 the use of skim-milk with corn is exemplified. It will be observed that in the one case the corn was whole while it was ground in the other. The longer period for which the whole corn was soaked in the one case may be expected, however, to exert as great an influence as the grinding in the other, upon the proportion of nutrients available. The data obtained from these experiments would indicate that 1·83 lbs. skim-milk were equivalent to 1 lb. corn. While this is not exactly in accordance with the results of other experiments here, it serves to emphasize the great value of skim-milk as a supplementary food, and as a supplement to no other grain does its effect seem so marked as when used with corn.

4. In Experiments 10 and 11 with barley and milk the same conditions obtain as are discussed in the preceding paragraph. It will be observed that while of barley fed alone 4·35 lbs. were required to produce 1 lb. of pork, only 3·64 lbs. were required for the same effect when fed with 2·52 lbs. of milk. Here also the feeding value of skim-milk seems very much greater than most work along this line would indicate.

5. In Experiments 12 and 13 the use of milk with a mixture of pease, barley and rye fed whole as compared with the same mixture fed alone, is illustrated. The mixture seems to bear the relation of 1 to 6·99 of milk.

6. In Experiments 14 and 15 a meal composed of equal parts of ground pease, barley aud rye was fed in the one case without milk when 4·36 lbs. were required to produce 1 lb. of pork and in the other case with all the skim-milk the pigs would consume in addition to the grain ration when 3·46 lbs. meal and 4·81 lbs. skim-milk produced 1 lb pork. Skim-milk according to this experiment would be worth about one-fifth ($\frac{100}{534}$) as much as an equal weight of the meal.

Yorkshire Youngsters.

7. In addition to the above work a summary of some other work is submitted below.

From tests made in 1892, 1893 and 1894 with 48 swine it appears that when a small quantity (about 3 pounds per head per day) of skim-milk was fed, *a less quantity* of it was equal to 1 pound of the grain in the feed consumed per pound of increase in live weight, than when a large quantity (about 15 pounds per head per day) was fed.

The results are shown in the following table :—

TABLE VIII.

| Number of Swine in Test. | Skim-milk consumed per head per day. | —— |
|---|---|---|
| | lbs. | |
| 4 | 2 | 1 pound corn equal to 1·83 pounds skim-milk. |
| 31 | 3 | 1 pound mixed grain equal to 3·23 pounds skim-milk. |
| 4 | 5·4 | 1 " " " 5·38 " " |
| 4 | 13·6 | 1 " frosted wheat " 7·91 " " |
| 5 | 15·7 | 1 " mixed grain " 7.34 " " |
| 2 | 17·1 | 1 " " " 8·82 " " |
| 2 | 23·7 | 1 " " " 7·76 " " |

*General Conclusions.* From these tests and from our experience in feeding young pigs, it appears that :—

(1.) Skim-milk may form the largest part of the feed of *young and growing pigs* with advantage and economy ;

(2.) For the fattening of swine weighing on the average over 100 pounds each, live weight, it is economical to give an *allowance* of skim-milk *not exceeding* 5 pounds per head per day ;

(3.) In every case the swine fed with part of their ration of skim-milk were lustier, *more vigorous* and of a more healthy appearance than swine fed wholly on a ration of grain.

(4) Skim-milk gives the best returns for the amount fed when it constitutes a comparatively small part of the total food fed.

(5) Skim-milk may generally speaking, be considered to be worth from one-sixth to one-fifth as much as mixed grain.

*Experiments contrasting the value of whole grain with similar grain when ground, as a pork producer.*

It is generally conceded that there is more or less waste when grain is fed whole to swine. Many feeders maintain, however, that the gains are practically equal from equal weights of grain whether fed whole or ground. To get some data on this point a number of experiments have been carried on here.

The following table gives a summary of the results with ten lots fed at different times and with different feeds.

TABLE IX.

| Experiment. | Feed. | How Prepared. | No. of Swine. | Average weight to start. | Average weight at finish. | Average net gain. | No. of days fed. | Average daily gain. | Average amount feed eaten. | Average amount feed for 1 lb. gain. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | lbs. | lbs. | lbs. | | p. c. | lbs. | p. c. |
| 1 | Pease, barley and rye ... | Whole, soaked 48 hours ........... | 5 | 69 | 156 | 87 | 119 | ·73 | 386 | 4·45 |
| 2 | Pease, barley and rye ..... | Ground, soaked 12 hours. .... ...... | 5 | 69 | 173 | 104 | 119 | ·87 | 455 | 4·36 |
| 3 | Pease, barley and rye ... | Whole, soaked 48 hrs. | 5 | 69 | 204 | 135 | 119 | 1·13 | 330 | 2·46 |
| | Skim-milk ......... | .................. | | | | | | | 1869 | 13·92 |
| 4 | Pease, barley and rye ...... | Ground soaked 12 hrs | 4 | 76 | 210 | 134 | 119 | 1·12 | 464 | 3·46 |
| | Skim-milk.............. | .................. | | | | | | | 645 | 4·81 |
| 5 | Oats, barley, pease and ½ part bran........... ... | Whole, dry... ..... | 4 | 67 | 175 | 108 | 119 | ·90 | 441 | 4·08 |
| 6 | Oats, barley, pease and ½ part bran.......... .. .. | Ground, dry ....... | 4 | 69 | 195 | 126 | 119 | 1·06 | 450 | 3·56 |
| 7 | Oats, barley, pease and ½ part bran.............. | Whole, soaked 30 hours............. | 4 | 66 | 171 | 105 | 119 | ·88 | 409 | 3·88 |
| 8 | Oats, barley, pease and ½ part bran.............. | Ground, soaked 30 hours........ .... | 4 | 66 | 190 | 124 | 119 | 1·04 | 467 | 3·76 |
| 9 | Oats, pease and barley.. ... | Whole, dry.......... | 4 | 103 | 185 | 82 | 76 | 1·08 | 307 | 3·60 |
| 10 | Oats, pease and barley...... | Ground, dry....... | 4 | 101 | 190 | 89 | 76 | 1·17 | 307 | 3·43 |

A study of the above table would seem to show that:—

1. When pease, barley and rye were fed whole, ·09 lbs. more of the mixture was required to produce a pound of pork than when fed ground. This is a gain of 2 per cent.

2. Lots 3 and 4 were given in each case all the skim-milk they would drink. While no *exact* feeding value can be attached to the skim-milk, yet a considerably greater gain is indicated from grinding the feed than in lots 1 and 2.

3. In lots 5 and 6, where a ration of oats, barley and straw was fed, first with the grain part unground and second with the grain part ground, a large gain is indicated, viz., 20 per cent.

4. In lots 7 and 8, where a similar ration to that in lots 5 and 6 was fed with the difference that in lots 5 and 6 it was fed dry, and in lots 7 and 8 it was fed soaked, a smaller gain of about 3 per cent is shown in favour of the ground feed.

5. In lots 9 and 10 a mixture of oats, pease and barley is fed whole and contrasted with a similar mixture when fed ground. A gain of almost 4 per cent is shown in favour of the ground feed.

6. While the results vary considerably it will be observed that in every case a gain is noticeable where ground feed is used rather than whole feed. It is quite safe to say that a gain of from 5 to 10 per cent may be looked for when ground grain rather than unground is fed.

In some experiments conducted here with whole grain an effort was made to ascertain the per cent of grain that escaped digestion when it was fed whole. The excrement was collected for 24 hours after the animals had been

on a fixed ration of one variety of grain for some weeks, and the following results obtained:

*a.* In case of whole oats where 14 lbs. feed was fed, 2 lbs. 6 oz. of undigested grain, or 21·6 per cent of the whole amount, was found in the excrement. One-tenth of this germinated.

*b.* In the case of whole barley where 17 lbs. was fed, 2 lbs. 2 oz. or 12½ per cent of the whole amount was found in the excrement. None of this would germinate.

*c.* In the case of whole pease where 17 lbs. was fed, 2 oz. only, or about ¾ of 1 per cent of the whole amount, was found in the excrement. None of this would germinate.

*d.* In the case of whole corn where 11 lbs. was fed, 8 oz. or nearly 5 per cent of the whole amount was found in the excrement. About one-twelfth of this germinated.

*e.* In the case of unground mixed grain (oats, pease and barley) where 11 lbs. of grain was fed 10 oz. or 5·7 per cent of the whole amount was found in the excrement. About one-fiftieth (oats) of this germinated.

*Experiments to determine the value of soaked feed as contrasted with similar feeds fed dry.*

It will be seen by referring to page 26 that experiments with cooked feed (grains) would indicate that the increased returns from cooked feed were not sufficient to pay for the extra work and expenditure. The nearest approach to cooking at practically no expense is soaking the food and the following experiments were carried on along this line. A number of other experiments include some data on this point, but they are so complex as to render their consideration under this head unadvisable.

TABLE X.

| Experiment. | Feed. | How Prepared. | No. of Swine. | Average weight to start. | Average weight to end. | Average net gain. | No. of days fed. | Average daily gain. | Average amount feed eaten. | Average amount feed for 1 lb gain. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | lbs. | lbs. | lbs. | lbs. | | lbs. | lbs. | lbs. |
| 1 | Pease, barley and rye. | Whole, and soaked 30 hours. | 4 | 66 | 171 | 105 | 119 | ·88 | 409 | 3·88 |
| 2 | " | Whole, dry | 4 | 67 | 175 | 108 | 119 | ·90 | 441 | 4·08 |
| 3 | " | Ground, soaked 30 hours. | 4 | 66 | 190 | 124 | 119 | 1·04 | 467 | 3·76 |
| 4 | " | Ground, dry | 4 | 69 | 195 | 126 | 119 | 1·06 | 450 | 3·56 |

It will be observed that in lots 1 and 2 where whole grain was fed that a considerable saving was apparently wrought in feed by soaking the grain. This amounted to about 6 per cent of the food fed lot 2.

In lots 3 and 4 it will be observed that ground grain was fed dry and compared with ground grain fed soaked. The data here would seem to point to a loss from soaking meal. While this may not be the actual case yet it is probable that the result from soaking meal may not be so marked as from soaking whole grain. A study of some other experimental work not submitted under this head would also indicate this.

*Experiments to determine the value of steamed or cooked feed, fed warm, as contrasted with raw feed, fed cold, including an experiment with pea ensilage.*

The following report is taken with slight changes from the report for 1891 :—

The object of this experiment was twofold—(1) to discover the difference, if any, in the quantity of grain required to produce every pound of increase of the live weight of the swine, when *fed steamed and warmed* in the one case, and when *fed raw and cold* in the other case ; (2) to obtain a record of the comparative quantities of grain required to produce every pound of increase in the live weight of the swine, during the different stages of the feeding period. The grains fed were ground pease, barley and rye, equal parts.

The mixture of grain was fed wet in both cases. Cold water was given to drink. A mixture of salt and wood ashes was kept in a box on the floor of each pen, where the pigs had access to it at will. In the following table the feeding period has been arranged into five periods of four weeks each, and one period of three weeks. It shows the gain in weight and the quantities of grain consumed.

TABLE XI.

| — | 9th December. | 5th January. | 2nd February. | 2nd March. | 30th March. | 27th April. | 18th May. | Totals. |
|---|---|---|---|---|---|---|---|---|
| *Pen 1—Four Swine—* | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Fed on a mixture of ground pease, barley and rye, *fed steamed and warmed :* | | | | | | | | |
| Live weight.................. | 302 | 407 | 614 | 808 | 917 | 974½ | 745* | ....*Three swine only. |
| Gain in weight.............. | .... | 105 | 207 | 194 | 109 | 57½ | 30 | 702½, gain in weight. |
| Feed consumed ............ | .... | 348 | 637 | 736 | 545 | 406 | 256 | 2,928, grain consumed. |
| Feed consumed per lb. of gain in live weight.... .. ... | .... | .... | .... | .... | .... | .... | .... | 4·16 lbs. grain. |
| *Pen 2—Four Swine.* | | | | | | | | |
| Fed on a mixture of ground pease, barley and rye, *fed raw and cold :* | | | | | | | | |
| Live weight.................. | 308 | 413½ | 597 | 723 | 781½ | 830½ | 872 | |
| Gain in weight........ ..... | .... | 105½ | 183½ | 126 | 58½ | 49 | 41½ | 564, gain in weight. |
| Feed consumed... ......... | .... | 348 | 563 | 558 | 413½ | 278½ | 237 | 2,398, grain consumed. |
| Feed consumed per lb. of gain in live weight ...... .... | .... | .... | .... | .... | .... | .... | .... | 4·25 lbs. grain. |
| *Pens 1 and 2.* | | | | | | | | |
| Average weight of pigs........ | 76 | 102½ | 151 | 191 | 212 | 225½ | 231 | |
| Average feed consumed per lb. of gain in live weight........ | .... | 3·31 | 3.07 | 4·04 | 5·73 | 6·45 | 6·93 | |
| Percentage of increase in feed consumed per lb. of gain in live weight.......... ..... | .... | .... | .... | 31% | 86% | 110% | 125% | |

In this experiment, the object was to discover the value, if any, of pea ensilage for the feeding and fattening of swine.

Records were also kept to ascertain the comparative quantities of feed required to produce every pound of increase in the live weight of the swine, during the different stages of the feeding period.

The pea ensilage was prepared by harvesting the crop when the earliest pods were filled and before the peas became hard. The vines were green and succulent The ensilage was well preserved. The pigs in lot 3 were fed an allowance of grain, a mixture of equal parts of ground peas, barley and rye, but not as much as they would have eaten readily. They were fed also a quantity of pea ensilage. The pigs in lot 4 were fed upon pea ensilage only. In both cases the pigs refused to eat more than a small portion of whatever quantity of pea ensilage was offered to them. The remainder was nosed over, pushed about and tramped on. When what was left uneaten was weighed out of the pens, it was very wet.

Both lots of pigs were allowed cold water to drink, and a mixture of salt and ashes was accessible to the pigs in both cases. The pea ensilage did not seem to have any feeding value to the pigs which received an allowance of grain; and the pigs in lot 4 steadily decreased in weight for nine weeks, when the feeding of ensilage was ended.

The following table contains the details of the weights of pigs, feed consumed, and rate of gain in live weight :—

TABLE XII.

| — | 29th December. | 5th January. | 2nd February. | 2nd March. | 30th March. | 27th April. | 18th May. | Totals. |
|---|---|---|---|---|---|---|---|---|
| *Lot 3—Four swine.* Fed on a mixture of ground pease, barley and rye, *fed, steamed and warmed,* and pea ensilage— | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight | 254 | 267 | 414 | *379 | 442 | 494 | 548 | *Three swine only. |
| Gain in weight | .... | 13 | 147 | 74 | 63 | 52 | 54 | 403, gain in weight. |
| Feed consumed. Grain | .... | 63 | 474 | 335 | 287 | 260 | 243 | 1,662, grain consumed. |
| Feed consumed. Pea ensilage | .... | 112½ | 682 | 345 | | | | |
| Pea ensilage left uneaten (wet) | .... | 100 | 625 | 319 | | | | |
| Grain consumed per lb. of gain in live weight | .... | .... | ... | .... | .... | .... | .... | 4·12, grain. |
| *Lot 4—Four swine.* Fed on pea ensilage only until 2nd March— | | | | | | | | |
| Live weight | 256 | 237 | 223 | 205 | | | | |
| Loss in weight | .... | 19 | 14 | 18 | .... | .... | .... | 51, loss in weight |
| Pea ensilage fed | .... | 235 | 1401 | 2127 | .... | | | |
| Pea ensilage left uneaten (wet) | .... | 150 | 938 | 1409 | .... | | | |
| After 2nd March, fed on a mixture of ground pease, barley and rye, *fed raw and cold*— | | | | | | | | |
| Live weight | .... | .... | .... | 205 | 395½ | 512½ | 571 | |
| Gain in weight | .... | .... | .... | .... | 190½ | 117 | 58½ | 366, gain in we ght. |
| Feed consumed | .... | .... | .... | .... | 443 | 388 | 327 | 1,158, grain consumed. |
| Feed consumed per lb. of gain in live weight | .... | .... | .... | .... | 2·32 | 3·31 | 5.59 | 3·16, grain |
| *Lots 3 and 4.* Average feed consumed per lb. of gain in live weight | .... | 4·84 | 3·22 | 4·52 | 2.88 | 3·83 | 5·06 | |

Lots 5 and 6 were fed similarly to lots 3 and 4, save that sugar beets were substituted for pea ensilage.

Table XIII shows the weights of the swine, the gains in weight, and the quantities of feed consumed.

TABLE XIII.

| — | 9th December. | 5th January. | 2nd February. | 2nd March. | 30th March. | 27th April. | 18th May. | Totals. |
|---|---|---|---|---|---|---|---|---|
| *Lot 5—Four Swine.* | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Fed on a mixture of ground pease barley and rye, *fed steamed and warmed*, and sugar beets— | | | | | | | | |
| Live weight | 187 | 258 | 425 | 581 | 669 | 744½ | 812 | |
| Gain in weight | .... | 71 | 167 | 156 | 88 | 75½ | 67½ | 625, gain in weight. |
| Feed consumed { Grain | .... | 333 | 412 | 540 | 475 | 369 | 282 | 2,411, grain consumed. |
| Feed consumed { Sugar beets | .... | 44½ | 330 | 313 | 320 | 308 | 224 | 1,538, sugar beets consumed. |
| Feed consumed per lb. of gain in weight | .... | .. | ... | .... | ... | .... | .. | { 3·86, grain. 2·46, sugar beets. |
| *Lot 6—Four Swine.* | | | | | | | | |
| Fed on a mixture of ground pease, barley and rye, *fed raw and cold*, and sugar beets— | | | | | | | | |
| Live weight | 201 | 272 | 415 | 547 | 692 | 731 | 772 | |
| Gain in weight | .... | 71 | 143 | 132 | 145 | 39 | 41 | 571, gain in weight. |
| Feed consumed { Grain | .... | 225 | 396 | 503 | 458 | 371 | 270 | 2,223, grain consumed. |
| Feed consumed { Sugar beets | .. | 60 | 320 | 307 | 310 | 322 | 244 | 1,503, sugar beets consumed. |
| Feed consumed per lb. of gain in live weight | .... | .... | ... | .... | .... | .... | .... | { 3·89, grain. 2·73, sugar beets. |
| *Lots 5 and 6.* | | | | | | | | |
| Average feed consumed per lb. of gain in live weight { Grain | .... | 3·93 | 2·61 | 3·62 | 4·00 | 6·50 | 4·33 | |
| Average feed consumed per lb. of gain in live weight { Sugar beets | .... | 0·72 | 2·10 | 2·15 | 2·73 | 5·52 | 5·11 | |
| Percentage of increase in feed consumed per lb. of gain in live weight | .... | .... | .... | 21 per ct. | | 90 per ct. | | |
| 1 lb. grain equal to 5 lbs. sugar beets | .... | .... | .... | .... | .... | .... | .... | |

The following table shows the quantities of feed consumed per pound of gain in live weight, during each of the six feeding periods. The duration of each feeding period was four weeks, with the exception of the first period for pens 4 and 5, and the last period for all the pens, which was three weeks. The grain fed in each case was a mixture of equal parts of ground pease, barley and rye. No notice is taken in this table of the pea ensilage fed to lots 4 and 5, as it did not appear to have any appreciable feeding value in these cases :—

TABLE XIV.

Pounds of feed consumed per pound of gain in the live weight of swine.

| Feeding Periods. | Lot 1, four swine; grain, fed steamed and warm. | Lot 2, four swine; grain, fed raw and cold. | Lot 3, four swine; grain, fed steamed and warm. | Lot 4, four swine; grain, fed raw and cold. | Lot 5, four swine; grain, fed steamed and warm, and sugar beets. | | Lot 6, four swine; grain, fed raw and cold, and sugar beets. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Grain | Sugar Beets | Grain | Sugar Beets |
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| First............ | 3·31 | 3·30 | 4·84 | .......... | 4·69 | 0·61 | 3·17 | 0·84 |
| Second .......... | 3·07 | 3·07 | 3·22 | .......... | 2·46 | 2·00 | 2·76 | 2 23 |
| Third............ | 3·79 | 4·43 | 4·52 | .......... | 3·46 | 2·00 | 3·81 | 2·32 |
| Fourth .......... | 5·00 | 7·07 | 4·55 | 2·32 | 5·40 | 3·63 | 3·15 | 2·13 |
| Fifth............ | 7·06 | 5·68 | 5·00 | 3·31 | 4·88 | 4·08 | 9·51 | 8·25 |
| Sixth........ .... | 8·53 | 5·71 | 4·50 | 5 59 | 4·17 | 3·31 | 6·58 | 6·00 |
| Average.... | 4·16 | 4·25 | 4·12 | 3·16 | 3·86 | 2·46 | 3·89 | 2·73 |

*Conclusions.*—The teaching of these three sets of experiments is to the effect that :—

(1.) There is no appreciable difference in the number of pounds of grain required to produce every pound of increase in the live weight of swine, when fed steamed and warm, as against fed raw and cold ;

(2.) On the average there is a gradual increase in the quantity of feed consumed, for every pound of gain in live weight of swine, after the second month of their feeding period and after the average live weight exceeds 100 lbs. :

(3.) It is most economical to market swine for slaughtering when they weigh from 180 to 200 lbs. alive ;

(4.) The largest consumption of feed per day by swine is at or near the period of their feeding when the number of pounds of feed consumed, per pound of increase in weight, is lowest ;

(5.) For the increase of weight by 3,231½ lbs. in 24 swine, 4·14 lbs. of a mixture of ground pease, barley and rye were required for every pound of increase in live weight.

*Experiments to determine the advisability of feeding a full or a limited ration.*

Many feeders claim that a full ration should be fed all through the fattening period, while others maintain that during the early weeks of the finishing or fattening period a comparatively scant ration should be

allowed. By full ration is meant all the animals will eat up clean, and by a scant ration some considerable amount less than this.

Very few experiments have been tried along the line here, nor yet do many other experiment stations appear to have done anything very important upon the question. The importance of this line of research has in the past not been so great as at present and nowhere on the American continent is it quite so worthy of pursuit as here.

UNLIMITED RATION LOT.

The question of the cost of producing hogs of the weight of 160 to 200 pounds, which shall show not over $1\frac{1}{2}$ inches of fat along the back as contrasted with the cost of producing the thick hog showing from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches of fat is at present of paramount importance, owing to the recent rapid developement of our bacon export trade which demands the former class of hog.

No conclusive deductions may be drawn from our work here along this line, but the following report is submitted of an experiment with twelve swine recently completed.

TABLE XV.

| Experiment. | Feed. | How Prepared. | No. of Swine. | Average weight at start. | Average weight at finish. | Average net gain. | No. of days fed. | Average daily gain. | Average amount feed eaten. | Average amount feed for 1 lb. gain. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | lbs. | lbs. | lbs. | | lbs. | lbs. | lbs. |
| 1 | Oats, pease and barley...... | Whole, amount limited .. | 4 | 103 | 185 | 82 | 76 | 1·08 | 307 | 3·60 |
| | Skim-milk ...... | Limited........ | | | | | | | 254 | 3·09 |
| 2 | Oats, pease and barley.... ..... | Ground, amount limited. | 4 | 101 | 190 | 89 | 76 | 1·17 | 307 | 3·43 |
| | Skim-milk........ | Limited. ........ | | | | | | | 254 | 2·85 |
| 3 | Oats, pease and barley......... | $\frac{3}{4}$ground, $\frac{1}{4}$whole; unlimited | 4 | 103 | 188 | 85 | 76 | 1·11 | 326 | 3·84 |
| | Skim-milk .. ... | Limited. ........ | | | | | | | 254 | 2·99 |

To lot 1 was fed a mixture of pease, oats and barley, whole. A daily allowance of 3 pounds per head of skim-milk was given to the three lots.

To lot 2 was fed a mixture of pease, oats and barley, ground.

To lot 3 was given a mixture of pease, oats and barley, morning and evening feed ground, but whole grain at noon.

Lots 1 and 2 were given 3 pounds meal each daily at first, and this was gradually increased until at the end of the feeding period they were receiving 4·25 pounds meal each day. Lot 3 started off with 5 pounds of meal each daily, this amount being all they would eat up clean.

Lots 1 and 2 were more easily fed than lot 3, for they exhibited no tendency to get "off their feed" at any time and made good progress.

Lot 3 took as much as $5\frac{1}{4}$ pounds meal per head when about a month on feed, but they soon fell from this large ration, and during the last month were able to eat only $3\frac{1}{2}$ pounds meal daily.

The pigs in lot 3 after being on feed for some time had a dull look while lots 1 and 2 were much more lively and thrifty in appearance.

Limited Ration Lot.

It will be observed that the amount of meal required for the production of 1 pound of pork was considerably less in the cases of the limited rations than in the unlimited one, viz.: ·24 pounds in the case of the whole-grain lot and ·41 pounds in the case of the ground-grain lot.

## To Discover the Causes of "Soft" Hogs.

The following report is taken with slight changes from the reports for 1894–95.

### *To discover the cause of "Soft" Hogs.*

A series of experiments were begun to discover the effect on the quality of the meat and cured bacon from the feeding of wheat and buckwheat to swine. Complaints were common from buyers of swine in Western Ontario that the quality of flesh was soft in a larger percentage of animals than formerly; and an opinion was current to the effect that the "softness" was the result of the feeding of wheat or of buckwheat.

*Fourteen swine* of three different litters were sorted into three lots as nearly even as possible.

Lot No. 2 contained four swine of the following breeding :—

2 crossbreds by *Berkshire* sire and *Improved Large Yorkshire* dam ;
1 do *Tamworth* sire and *Berkshire* dam ;
1 purebred *Tamworth.*

These were fed on *a mixture* of equal parts by measure of barley, rye, wheat (all ground) and wheat bran, soaked in cold water for an average period of thirty hours.

TABLE XVI.

| Lot No. 2. | First weight. | Weight at end of 1st four weeks. | Weight at end of 2nd four weeks. | Final weight. | Totals. |
|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight .. . ............ | 477 | 624 | 718 | 786 | .... ..... |
| Increase in weight............ | ..... .... | 147 | 94 | 68 | 309 |
| Feed consumed.............. | .......... | 614 | 382 | 326 | 1,322 |
| " per pound of increase in live weight............ | ......... | 4·17 | 4·06 | 4·79 | 4·28 |

Lot No. 4 contained 5 swine of the following breeding :—

3 crossbreds by *Berkshire* sire and *Improved Large Yorkshire* dam.
2 do *Tamworth* sire and *Berkshire* dam.

These were fed on *ground wheat* soaked in cold water for an average period af thirty hours.

TABLE XVII.

| Lot No. 4. | First weignt. | Weight at end of 1st four weeks. | Weight at end of 2nd four weeks. | Final weight. | Totals. |
|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight.................. | 483 | 620 | 716 | 793 | .......... |
| Increase in weight............ | .......... | 137 | 96 | 77 | 310 |
| Feed consumed............... | ... .... | 616 | 369 | 287 | 1,272 |
| " per pound of increase in live weight... ........ | .......... | 4·49 | 3·84 | 3·72 | 4·10 |

Lot No. 6 contained 5 swine of the following breeding :—

3 crossbreds by *Berkshire* sire and *Improved Large Yorkshire* dam.
1 do *Tamworth* sire and *Berkshire* dam.
1 purebred *Tamworth.*

These were fed on *ground buckwheat* soaked in cold water for an average period of thirty hours.

TABLE XVIII.

| Lot No. 6. | First weight. | Weight at end of 1st four weeks. | Weight at end of 2nd four weeks. | Final weight. | Totals. |
|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight | 515 | 632 | 840 | 989 | ...... |
| Increase in weight | ...... | 117 | 208 | 149 | 474 |
| Feed consumed | ...... | 655 | 794 | 660 | 2,109 |
| " per pound of increase in live weight | ...... | 5·59 | 3·81 | 4·42 | 4·45 |

These 14 swine were shipped alive to the Ingersoll Packing Company, Ingersoll, Ont., to be slaughtered and cured in the manner followed by packers who send bacon and hams to the British market. The swine of each lot were marked differently, and a report was made upon them by the manager of the Ingersoll Packing Company according to the descriptive marks.

The report on the condition of the swine, 10 hours after they were killed, was as follows :—

"Lot 1, fed on mixed grain ; leaf lard, fairly firm ; best of the three lots.

Lot 2, fed on ground wheat ; lard softish ; not so firm as hogs of lot 1.

Lot 3, fed on ground buckwheat ; lard soft, and hogs also soft.

The report on the sides of bacon after they were cured was as follows :—

Lot 1, fed on mixed grain ; four hogs ; all the sides turned out good hard meat, they were the best of the three lots.

Lot 2, fed on ground wheat ; five hogs ; six sides were soft and four quite firm.

Lot 3, fed on ground buckwheat ; five hogs ; two sides were soft and eight sides were firm.

"*Conclusion.*—From these tests it is evident that the feeding of wheat alone and of buckwheat alone is *not always a cause* of 'soft' hogs and 'soft' sides, since some of the swine fed on wheat and buckwheat yielded sides classed as firm."

*Eight swine* of a litter of cross-breds of *Tamworth* sire and *Poland-China* dam were put into three lots as nearly even as possible.

TABLE XIX.

Lot No. 1 contained 3 swine.

They were fed on *a mixture* composed of equal parts, by measure, of barley, rye, wheat (all ground), and wheat bran, soaked in cold water for an average period of 30 hours.

| Pen No. 1. | First weight. | Four weeks. | Eight weeks. | Twelve weeks. | Sixteen weeks. | Twenty weeks. | Totals. |
|---|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight | 117 | 177 | 238 | 317 | 384 | 438 | ...... |
| Increase in weight | ...... | 60 | 61 | 79 | 67 | 54 | 321 |
| Feed consumed | ...... | 198 | 210 | 239·5 | 233 | 224 | 1104·5 |
| " per lb. of increase in live weight | ...... | 3·30 | 3·44 | 3·03 | 3·47 | 4·14 | 3·44 |

TABLE XX.

Lot No. 3 contained 3 swine.

They were fed on a ration composed of *equal parts* by weight of a *mixture* as fed to lot No. 1, and *ground wheat*, soaked in cold water for an average period of 30 hours.

| Lot No. 3. | First weight. | Four weeks. | Eight weeks. | Twelve weeks. | Sixteen weeks. | Twenty weeks. | Totals. |
|---|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight | 117 | 181 | 228 | 302 | 370 | 420 | ........ |
| Increase in weight | ........ | 64 | 47 | 74 | 68 | 50 | 303 |
| Feed consumed | ........ | 208 | 178 | 217 | 242 | 212 | 1057 |
| " per lb. of increase in live weight | ........ | 3·25 | 3·78 | 2·93 | 3·55 | 4·24 | 3·48 |

TABLE XXI.

Lot No. 5 contained 2 swine.

They were fed on a ration composed of *equal parts* by weight of a *mixture* as fed to lot No. 1, and *ground buckwheat*, soaked in cold water for an average period of 30 hours.

| Lot No. 5. | First weight. | Four weeks. | Eight weeks. | Twelve weeks. | Sixteen weeks. | Twenty weeks. | Totals. |
|---|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight | 96 | 166 | 247 | 337 | 395 | 445 | ........ |
| Increase in weight | ........ | 70 | 81 | 90 | 58 | 50 | 349 |
| Feed consumed | ........ | 203 | 264 | 316 | 284 | 256 | 1323 |
| " per lb. of increase in live weight | ........ | 2·90 | 3·25 | 3·51 | 4·89 | 5·12 | 3·79 |

*Eight* swine of a litter of crossbreds of *Essex* sire and *Yorkshire* dam were put into *two* lots as nearly even as possible.

TABLE XXII.

Lot No. 7 contained 4 swine.

They were fed on a ration composed of *equal parts* by weight of a *mixture*, as fed to lot No. 1 (equal parts by measure of barley, rye, wheat, all ground, and wheat bran), and *ground wheat*, soaked in cold water for an average period of 30 hours.

| Lot No. 7. | First weight. | Four weeks. | Eight weeks. | Twelve weeks. | Sixteen weeks. | Twenty weeks. | Totals. |
|---|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight | 223 | 300 | 383 | 465 | 528 | 569 | ........ |
| Increase in weight | ........ | 77 | 83 | 82 | 63 | 41 | 346 |
| Feed consumed | ........ | 350 | 285 | 288 | 255 | 228 | 1,406 |
| " per lb. of increase in live weight | ........ | 4·54 | 3·43 | 3·51 | 4·04 | 5·56 | 4·06 |

## Table XXIII.

Lot No. 8 contained 4 swine.

They were fed on a ration composed of *equal parts* by weight of a *mixture*, as fed to lot No. 1 (equal parts by measure of barley, rye, wheat, all ground, and wheat bran), and *ground buckwheat*, soaked in cold water for an average period of 30 hours.

| Lot No. 8. | First weight. | Four weeks. | Eight weeks. | Twelve weeks. | Sixteen weeks. | Twenty weeks. | Totals. |
|---|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Live weight. | 220 | 323 | 459 | 551 | 635 | 671 | ...... |
| Increase in weight. | ........ | 103 | 136 | 92 | 84 | 36 | 451 |
| Feed consumed. | ........ | 404 | 442 | 411 | 383 | 275 | 1,915 |
| " per lb. of increase in live weight | ........ | 3·92 | 3.25 | 4·46 | 4·55 | 7 63 | 4·24 |

*Conclusions.*—1. From the tests in 1894 referred to at page 29, it is evident that the feeding of wheat alone and of buckwheat alone is **not always a cause** of "soft" hogs and "soft" sides, since some of the swine fed on wheat and buckwheat yielded sides classed as firm;

2.—The report of the buyer and curer on the swine reported on in Tables XIX. XX. XXI. and XXII. was that he could not detect any differences in the quality of the meat; from which it is evident that the feeding of rations composed to the extent of one-half of ground wheat and to the extent of one-half of ground buckwheat is **not a cause** of "soft" sides.

Table XXIV. below is a summary of the more important data gleaned from an experiment recently completed. It was conducted here in the fall of 1898 on the suggestion of Prof. J. W. Robertson, the Commissioner of Agriculture and Dairying. This experiment included 44 hogs of mixed breeding. They were divided into 11 lots of four each and fed as indicated below. The aggregate weights of the lot are given in each case. The hogs were fed for 84 days. They were given all they would eat up clean, until the 28th day before the completion of the experiment, when it appeared as though most of the animals were likely to be too fat by the time the required weight was reached. To prevent this the ration of each lot was reduced 25 per cent.

TABLE XXIV.

| Lot. | Feed. | How Prepared. | Weight to start. | Weight to end. | Yard Inspection. | Inside Inspection. | Report on Cured Product. |
|---|---|---|---|---|---|---|---|
| | | | lbs. | lbs. | | | |
| 1 | ½ pease, barley and oats; ½ bran | Ground and soaked 30 hours | 190 | 714 | 1 small, 3 fat | 1 No. 1, 3 No. 2 | 2 small, tender; 2 No. 1 selection, tender. |
| 2 | " with ⅛ clover | Soaked 30 hours | 207 | 656 | 2 fats, 2 smalls | 4 No. 1 | 3 very soft, 1 tender. |
| 3 | Whole corn | Fed dry | 400 | 679 | 1 light, 1 small, 2 straights. | 4 No. 1 | 3 tender, 1 soft. |
| 4 | Ground corn | Soaked 30 hours | 401 | 746 | 3 straights, 1 fat | 2 No. 1, 2 No. 2 | 3 fat, hard; 1 No. 1 selection. |
| 5 | Ground corn, skim-milk | Soaked 30 hours | 403 | 965 | 4 fats | 4 No. 2 | 2 good quality, fat; 2 good quality, very fat. |
| 6 | ½ whole corn, ½ whole pease, oats and barley | Fed dry and unground | 408 | 785 | 3 straights, 1 fat | 2 No. 1, 2 No. 2 | 2 good, No. 1 selection; 2 good, No. 2 selection. |
| 7 | ½ corn; ½ pease, oats and barley | Soaked 30 hours; ground | 410 | 919 | 1 straights, 3 fats | 1 No. 1, 3 No. 2 | 2 good quality, 1 No. 1 selection and 1 No. 2, sel.; 2 good, but fat. |
| 8 | ½ corn; ½ pease, oats and barley; skim-milk | Ground and soaked 30 hours | 411 | 935 | 1 straight, 3 fats | 2 No. 1, 2 No. 2 | 2 good, No. 1 sel.; 2 good, fat. |
| 9 | Oats, barley and pease | Whole dry | 413 | 750 | 1 fat, 3 straights | 4 No. 1 | 2 No. 1 selection, 2 tender sel. |
| 10 | Oats, barley and pease | Ground and soaked 30 hours | 414 | 820 | 3 fats, 1 straight | 1 No. 1 and 3 No. 2 | 3 good, selected, fleshy; 1 good, No. 1 selection. |
| 11 | Oats, barley and pease; skim-milk | Ground and soaked 30 hours | 416 | 835 | 2 fats, 2 straights | 2 No. 1 and 2 No. 2 | 2 good, No 1 selection; 2 good, No. 2 selection. |

In addition to the reports contained in the table above, the following criticisms of each lot were made by The William Davies Company Limited, Toronto:

Lot 1.—"37 and 40 almost soft, will go into rejected bacon; 36 and 39 doubtful quality."

Lot 2.—"41, 42, 44, wretched quality with no redeeming feature; 43, doubtful quality."

Lot 3.—"The fat on these hogs has a somewhat pasty feel, and if any hard substance is rubbed lengthwise on it, it scrapes off somewhat like lard."

Lot 4.—"The fat in all these hogs feels somewhat greasy under the finger."

Lot 5.—"Wiltshire sides."

Lot 6.—"Wiltshire sides."

Lot 7.—"One must be used for home trade."

Lot 8.—"Too fat for export."

Lot 9.—"Distinctly doubtful quality."

Lot 10.—"Wiltshire sides."

Lot 11.—"This group is singular among all the rest in that the fat is firm and hard, an entire absence of the greasy feeling noticeable on nearly all the others. It would not surprise us if the flesh and fat in this parcel were too hard and firm."

A Summer Home.

## Summary.

The experiments conducted and reported upon as above seem to indicate that:

1. It will not pay to cook feed for swine where economy of pork production is the sole consideration.
2. There is a gradual increase in the quantity of feed consumed for every pound of gain in live weight after the average live weight exceeds 100 lbs.
3. The most economical time to slaughter swine is when they weigh from 175 to 200 lbs.

4. The greatest and most economical gains are made when the swine are able to eat the most feed in proportion to their weight.

5. Frozen wheat may be used as a profitable feed for swine.

6. Skim-milk adds most materially to the value of a grain ration, and 100 lbs. mixed grains equal about 700 lbs. skim-milk. The relative value of skim-milk in any ration varies with the amount fed, the poorest returns per pound fed being obtained when the proportion of skim-milk to the total food is the greatest.

7. The average dressed weight of swine is about 76·44 per cent of the fasted weight.

8. Skim-milk is a most valuable adjunct to the grain ration when hard flesh is desired.

9. Type of animals fed influences character of meat more than breed, *i. e.*, the fact of an animal being a Yorkshire or a Tamworth will not insure a good bacon carcase, but they must also be of a rangy type and fed in a certain way.

10. Feeding mixed meal (barley, pease and oats) with milk, usually insures firm meat.

11. The greatest gains from a given amount of grain appear to be made when it is ground and soaked for 24 hours. Part of grain fed whole is frequently voided before being digested.

12. Mixed grains are more economical than grains fed pure.

13. Pigs whose rations are limited make, on the whole, more economical gains than pigs that are rushed.

14. Maturity or ripeness of the animal affects the quality of the flesh.

[illegible]

DEPARTMENT OF AGRICULTURE

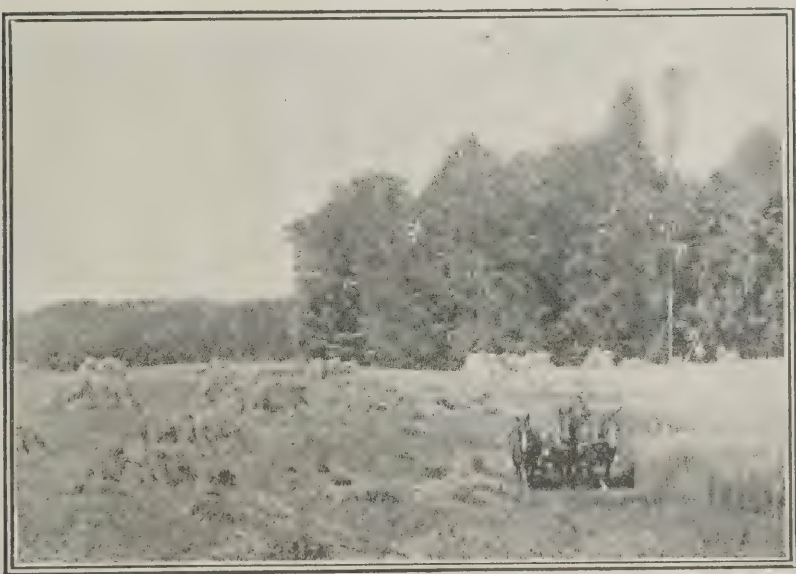
# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

## RESULTS OBTAINED IN 1899

FROM

# Trial Plots of Grain, Fodder Corn, Field Roots and Potatoes



By Wm. SAUNDERS, LL.D.,

*Director Experimental Farms*

BULLETIN No. 34

DECEMBER, 1899

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE

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To the Honourable

The Minister of Agriculture.

Sir,—I beg to submit for your approval Bulletin No. 34 of the Experimental Farm series, prepared by myself. In this publication there are presented the results of a large number of experiments which have been conducted at all the experimental farms under your department during the season of 1899, with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots, sugar beets and potatoes in uniform plots. The average results are also given of five years' tests on such plots with varieties of oats, barley, spring wheat and potatoes, four and five years' experience with Indian corn, four years' with plots of pease, turnips, mangels and carrots and three years' experience with sugar beets.

This work of testing varieties is being conducted with the object of gaining information as to their relative productiveness and earliness in ripening. The results show wide variations in the weight of the crops grown and indicate the importance of the exercise of care in the choice of varieties of seed for sowing. It is hoped that the results presented, covering the experience gained under some of the most important climatic variations found in the Dominion will prove useful to farmers in every part of Canada.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,

*Director Experimental Farms.*

Ottawa, 29th December, 1899.

# RESULTS OBTAINED IN 1899

FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN, FIELD ROOTS AND POTATOES

By William Saunders, LL.D., F.R.S.C., F.L.S., &c.

*Director Experimental Farms.*

In this bulletin particulars are given of the results obtained from the uniform trial plots of grain, fodder corn, field roots and potatoes at each of the Dominion Experimental Farms during the year 1899, also the average results had during a series of years. While the crops grown on these plots during the season of 1898 were well above the average those of 1899 have been still more satisfactory. In grain the increase has been most marked. In oats the average yield of all the varieties tested at all the experimental farms has exceeded that of the previous year by 11 bushels 1 lb. per acre, two-rowed barley by 7 bush. 17 lbs., six-rowed barley by 3 bush. 47 lbs. and spring wheat by 3 bush. 50 lbs. per acre. The excellent average crops of turnips, mangels and carrots had in 1898 were well maintained in 1899, there was an increase in the yield of potatoes at Ottawa and Nappan, but a decrease at Brandon, Indian Head and Agassiz. The season throughout the Dominion was less favourable for Indian corn and in this crop there was a falling off in yield.

In arranging these experiments the plan carried out during the past four years has been continued. The same varieties have been sown at each of the Experimental Farms, the land chosen for the plots has been as nearly uniform in character as could be had and was brought into a good condition of tilth. The seed has been sown early and has been well cleaned and screened before sowing so as to separate the smaller kernels, leaving only the plump and well-matured grain for seed. As far as practicable all the varieties of the same cereal have been sown on the same day or at most within two or three days so as to give to all an even start. Many new varieties of cereals which have been produced on the experimental farms by cross-fertilizing during the past ten years are included in these tests, a list of the names of these will be found in each case in the paragraph preceding the table of returns.

In presenting the information gained by the experience of 1899 the weight of crop obtained in each case is given and the varieties are placed in the order of their productiveness at the Central Experimental Farm at Ottawa. The number of days required for each sort from sowing to ripening is also added, and thus their relative earliness is shown.

In comparing the results of one single year with another the relative positions occupied by each variety in point of productiveness will often vary, arising from lack of uniformity in the soil, and other causes ; but the average experience for four and five years given in the latter part of this bulletin affords satisfactory evidence bearing on the relative productiveness of each sort. The reader is referred to the summary at the end of the bulletin for particulars on this point.

By the issue of this bulletin early in the season, the information obtained is placed promptly in the hands of the farmers of Canada who are thus advised as to the results which have been had before making their selection of seed for sowing during the coming year.

## TRIAL PLOTS OF OATS.

Seventy-one varieties of oats have been tested during the season of 1899. These include thirteen cross-bred sorts which have been produced at the Experimental Farms, namely, Olive, Oxford, Cromwell, Miller, Kendal, Medal, Milford, Russell, Master, Brandon, Holland, King and Pense. The size of the plots on which these oats were sown was one fortieth of an acre each at Ottawa, Ont., Nappan, N.S., and Agassiz, B.C., and one-twentieth of an acre each at Brandon, Man., and Indian Head, N.W.T. The quantity of seed sown of each variety was in the proportion of two bushels per acre, and the dates of sowing were as follows:—At Ottawa, May 2 ; Nappan, May 8 and 9 ; Brandon, May 10 ; Indian Head, May 12 ; and at Agassiz, April 20 to 24.

Particulars as to the character of the land in each case, also the preparation and treatment it has had, will be found in the Annual Report of the Experimental Farms for 1899.

## UNIFORM TEST PLOTS OF OATS.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, Season of 1899. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Thousand Dollar | 74 | 4 | 81 | 6 | 78 | 8 | 64 | 4 | 62 | 32 | 72 | 4 | 94 | 112 | 98 | 105 | 119 | 105$\frac{3}{5}$ |
| 2 | Golden Giant | 68 | 8 | 81 | 6 | 89 | 4 | 66 | 16 | 76 | 16 | 76 | 10 | 101 | 123 | 113 | 119 | 125 | 116$\frac{4}{5}$ |
| 3 | Holstein Prolific | 67 | 22 | 82 | 12 | 92 | 2 | 97 | 2 | 73 | 18 | 82 | 17 | 97 | 117 | 104 | 110 | 121 | 109$\frac{4}{5}$ |
| 4 | Poland | 67 | 2 | 76 | 16 | 105 | 20 | 86 | 16 | 58 | 6 | 78 | 25 | 94 | 106 | 97 | 102 | 120 | 103$\frac{4}{5}$ |
| 5 | New Zealand | 66 | 16 | 91 | 26 | 83 | 28 | 95 | 10 | 83 | 4 | 84 | 3 | 105 | 119 | 115 | 120 | 113 | 114$\frac{2}{5}$ |
| 6 | Banner | 65 | 30 | 87 | 6 | 110 | 10 | 95 | 30 | 67 | 12 | 85 | 11 | 97 | 114 | 106 | 111 | 119 | 109$\frac{2}{5}$ |
| 7 | American Triumph | 65 | 30 | 74 | 4 | 93 | 8 | 93 | 18 | 61 | 16 | 77 | 22 | 97 | 119 | 104 | 110 | 118 | 109$\frac{3}{5}$ |
| 8 | Danish Island | 65 | 30 | 89 | 14 | 86 | 26 | 91 | 26 | 73 | 28 | 81 | 18 | 95 | 118 | 104 | 111 | 121 | 109$\frac{4}{5}$ |
| 9 | American Beauty | 64 | 24 | 89 | 14 | 108 | 28 | 92 | 32 | 71 | 16 | 85 | 15 | 97 | 117 | 106 | 111 | 117 | 109$\frac{3}{5}$ |
| 10 | Columbus | 64 | 24 | 81 | 6 | 88 | 28 | 88 | 28 | 65 | 10 | 77 | 26 | 95 | 113 | 100 | 111 | 120 | 107$\frac{4}{5}$ |
| 11 | White Giant | 64 | 24 | 89 | 14 | 86 | 16 | 68 | 28 | 70 | 10 | 74 | 32 | 97 | 118 | 100 | 111 | 119 | 109 |
| 12 | Prolific Blk. Tartarian | 61 | 26 | 82 | 12 | 80 | 20 | 69 | 14 | 78 | 2 | 74 | 15 | 99 | 112 | 110 | 120 | 125 | 113$\frac{1}{5}$ |
| 13 | Mennonite | 61 | 6 | 91 | 26 | 83 | 18 | 71 | 26 | 64 | 4 | 74 | 16 | 97 | 114 | 101 | 105 | 116 | 106$\frac{3}{5}$ |
| 14 | Abyssinia | 60 | .. | 91 | 26 | 90 | 10 | 71 | 6 | 75 | 33 | 77 | 28 | 97 | 113 | 106 | 111 | 126 | 110$\frac{3}{5}$ |
| 15 | Golden Tartarian | 60 | .. | 76 | 16 | 90 | 20 | 72 | 12 | 76 | 16 | 75 | 6 | 99 | 123 | 110 | 119 | 117 | 113$\frac{3}{5}$ |
| 16 | Oderbruch | 59 | 14 | 98 | 28 | 90 | 10 | 64 | 4 | 67 | 2 | 75 | 32 | 97 | 114 | 106 | 112 | 117 | 109$\frac{1}{5}$ |
| 17 | Joanette | 59 | 14 | 71 | 26 | 75 | 10 | 91 | 6 | 48 | 18 | 69 | 8 | 99 | 115 | 104 | 112 | 123 | 110$\frac{3}{5}$ |
| 18 | Lincoln | 58 | 28 | 92 | 32 | 92 | 32 | 81 | 26 | 65 | 10 | 78 | 12 | 97 | 113 | 105 | 111 | 117 | 108$\frac{3}{5}$ |
| 19 | Olive | 58 | 8 | 89 | 14 | 72 | 2 | 77 | 2 | 63 | 28 | 72 | 4 | 98 | 116 | 108 | 119 | 124 | 113 |
| 20 | Bavarian | 57 | 22 | 75 | 10 | 98 | 18 | 96 | 16 | 62 | 32 | 78 | 6 | 97 | 114 | 104 | 111 | 118 | 108$\frac{4}{5}$ |
| 21 | Winter Grey | 57 | 2 | 64 | 24 | 91 | 6 | 80 | 20 | 67 | 22 | 72 | 8 | 93 | 115 | 97 | 102 | 121 | 105$\frac{3}{5}$ |
| 22 | Black Tartarian Imported 1899 | 55 | 10 | 94 | 4 | 82 | 32 | 88 | 28 | 78 | 28 | 80 | .. | 99 | 116 | 110 | 119 | 110 | 110$\frac{4}{5}$ |
| 23 | Wallis | 54 | .. | 94 | 32 | 84 | 14 | 78 | 28 | 67 | 32 | 76 | 1 | 94 | 113 | 104 | 111 | 121 | 108$\frac{3}{5}$ |
| 24 | Improved Ligowo Imported 1899 | 52 | 32 | 83 | 18 | 100 | 20 | 55 | 10 | 69 | 24 | 72 | 16 | 96 | 118 | 106 | 110 | 111 | 108$\frac{1}{5}$ |
| 25 | Improved Ligowo, Home Grown | 52 | 12 | 76 | 16 | 84 | 24 | 64 | 24 | 58 | 6 | 67 | 9 | 96 | 119 | 100 | 102 | 123 | 108 |
| 26 | Oxford | 52 | 12 | 74 | 4 | 79 | 4 | 74 | 4 | 72 | 2 | 70 | 12 | 97 | 118 | 106 | 119 | 118 | 111$\frac{3}{5}$ |
| 27 | Wide Awake | 52 | 12 | 90 | 20 | 103 | 28 | 90 | .. | 60 | 30 | 79 | 18 | 97 | 113 | 102 | 110 | 125 | 109$\frac{3}{5}$ |
| 28 | Early Maine | 51 | 26 | 83 | 18 | 107 | 22 | 81 | 26 | 70 | 20 | 79 | 2 | 99 | 118 | 105 | 113 | 121 | 111$\frac{1}{5}$ |
| 29 | Victoria Prize | 51 | 6 | 80 | .. | 56 | 26 | 87 | 22 | 58 | 16 | 66 | 27 | 94 | 113 | 92 | 102 | 123 | 104$\frac{4}{5}$ |
| 30 | Cromwell | 51 | 6 | 69 | 14 | 72 | 12 | 70 | 20 | 60 | 20 | 64 | 28 | 98 | 116 | 104 | 119 | 124 | 112$\frac{1}{5}$ |
| 31 | Early Archangel | 51 | 6 | 77 | 22 | 98 | 28 | 87 | 2 | 57 | 2 | 74 | 12 | 94 | 113 | 104 | 111 | 120 | 108$\frac{2}{5}$ |
| 32 | White Russian | 50 | 20 | 94 | 4 | 79 | 4 | 90 | .. | 62 | 22 | 75 | 10 | 97 | 114 | 108 | 105 | 119 | 108$\frac{3}{5}$ |
| 33 | Early Golden Prolific | 50 | 20 | 94 | 4 | 86 | 36 | 87 | 2 | 61 | 6 | 76 | .. | 97 | 114 | 104 | 111 | 125 | 110$\frac{1}{5}$ |
| 34 | Early Gothland | 50 | 20 | 83 | 18 | 93 | 18 | 78 | 28 | 65 | 20 | 74 | 14 | 97 | 114 | 103 | 119 | 117 | 110 |
| 35 | Improved American | 49 | 14 | 81 | 6 | 86 | 16 | 85 | 30 | 64 | 24 | 73 | 18 | 97 | 118 | 100 | 113 | 126 | 110$\frac{4}{5}$ |
| 36 | California Prol. Blk. Imported 1899 | 49 | 14 | 104 | 24 | 76 | 6 | 78 | 8 | 91 | 6 | 79 | 32 | 97 | 113 | 110 | 119 | 116 | 111 |
| 37 | Newmarket | 49 | 14 | 81 | 6 | 82 | 32 | 88 | 8 | 61 | 6 | 72 | 20 | 97 | 116 | 160 | 110 | 124 | 109$\frac{2}{5}$ |
| 38 | Hazlett's Seizure | 48 | 8 | 74 | 4 | 106 | 16 | 60 | .. | 60 | 10 | 69 | 28 | 97 | 114 | 104 | 105 | 119 | 107$\frac{4}{5}$ |
| 39 | Golden Beauty | 48 | 8 | 81 | 6 | 102 | 12 | 97 | 22 | 52 | 2 | 76 | 10 | 96 | 114 | 105 | 110 | 125 | 110 |
| 40 | Salines | 48 | 8 | 91 | 26 | 94 | 24 | 78 | 8 | 83 | 18 | 79 | 10 | 98 | 118 | 111 | 119 | 113 | 111$\frac{4}{5}$ |
| 41 | Buckbee's Illinois | 47 | 22 | 74 | 4 | 109 | 24 | 88 | 8 | 60 | .. | 75 | 32 | 100 | 116 | 109 | 110 | 119 | 110$\frac{4}{5}$ |
| 42 | Flying Scotchman | 47 | 22 | 71 | 26 | 71 | 6 | 74 | 4 | 60 | .. | 64 | 32 | 93 | 112 | 98 | 105 | 125 | 106$\frac{3}{5}$ |
| 43 | Miller | 47 | 2 | 89 | 14 | 113 | 18 | 82 | 32 | 89 | 14 | 84 | 16 | 97 | 114 | 104 | 119 | 125 | 111$\frac{4}{5}$ |
| 44 | Kendal | 47 | 2 | 89 | 14 | 71 | 26 | 79 | 14 | 63 | 8 | 70 | 6 | 97 | 118 | 110 | 119 | 115 | 111$\frac{4}{5}$ |
| 45 | Medal | 47 | 2 | 70 | 20 | 86 | 6 | 64 | 4 | 72 | 12 | 68 | 2 | 98 | 118 | 106 | 119 | 124 | 113 |
| 46 | Siberian O. A. C | 47 | 2 | 96 | 16 | 86 | 26 | 92 | 12 | 58 | 26 | 76 | 10 | 98 | 118 | 102 | 119 | 126 | 112$\frac{3}{5}$ |
| 47 | California Prol. Blk. | 45 | 30 | 69 | 14 | 80 | .. | 87 | 22 | 72 | 32 | 70 | 6 | 97 | 113 | 110 | 120 | 120 | 112 |
| 48 | White Schonen | 45 | 10 | 81 | 6 | 92 | 12 | 87 | 22 | 68 | 8 | 74 | 32 | 98 | 114 | 102 | 111 | 117 | 108$\frac{2}{5}$ |
| 49 | Cream Egyptian | 45 | 10 | 95 | 10 | 74 | 4 | 84 | 4 | 52 | 32 | 70 | 12 | 97 | 113 | 96 | 102 | 121 | 105$\frac{4}{5}$ |
| 50 | Rosedale | 45 | 10 | 87 | 6 | 58 | 18 | 68 | 28 | 56 | 6 | 63 | 7 | 95 | 114 | 104 | 111 | 117 | 108$\frac{1}{5}$ |
| 51 | Milford | 44 | 24 | 90 | 20 | 68 | 8 | 86 | 16 | 57 | 2 | 69 | 7 | 99 | 118 | 108 | 119 | 116 | 112 |
| 52 | White Wonder | 44 | 4 | 62 | 12 | 72 | 32 | 74 | 24 | 54 | 24 | 61 | 26 | 92 | 113 | 95 | 102 | 121 | 104$^{3}$ |

## UNIFORM TEST PLOTS OF OATS—*Concluded.*

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, Season of 1899. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 53 | Russell........ | 43 | 18 | 71 | 26 | 92 | 2 | 72 | 12 | 74 | 4 | 70 | 26 | 98 | 118 | 105 | 119 | 124 | $112\frac{4}{5}$ |
| 54 | Master ........ | 43 | 18 | 80 | .. | 88 | 28 | 65 | 30 | 44 | 4 | 64 | 16 | 99 | 116 | 101 | 119 | 115 | 110 |
| 55 | Abundance........ | 41 | 26 | 88 | 8 | 98 | 8 | 97 | 2 | 62 | 12 | 77 | 18 | 97 | 114 | 106 | 111 | 126 | $110\frac{4}{5}$ |
| 56 | Scottish Chief........ | 41 | 26 | 67 | 2 | 71 | 26 | 88 | 8 | 70 | 30 | 67 | 32 | 92 | 113 | 92 | 102 | 119 | $103\frac{3}{5}$ |
| 57 | Bonanza........ | 41 | 26 | 67 | 2 | 92 | 22 | 90 | 20 | 46 | 26 | 67 | 26 | 93 | 114 | 96 | 102 | 121 | $105\frac{1}{5}$ |
| 58 | Early Blossom........ | 41 | 26 | 87 | 6 | 94 | 24 | 80 | 20 | 75 | 16 | 75 | 32 | 97 | 113 | 110 | 119 | 125 | $112\frac{4}{5}$ |
| 59 | Rennie's Prize White | 40 | 20 | 88 | 8 | 76 | 16 | 83 | 18 | 43 | 28 | 66 | 18 | 99 | 106 | 98 | 102 | 125 | 106 |
| 60 | Brandon........ | 40 | 20 | 65 | 30 | 79 | 24 | 71 | 6 | 44 | 4 | 60 | 10 | 97 | 118 | 106 | 119 | 125 | 113 |
| 61 | Holland ........ | 40 | .. | 87 | 6 | 80 | 30 | 76 | 16 | 68 | 18 | 70 | 21 | 99 | 123 | 113 | 119 | 120 | $114\frac{4}{5}$ |
| 62 | King........ | 39 | 14 | 75 | 10 | 105 | 20 | 90 | .. | 78 | 14 | 77 | 25 | 97 | 119 | 106 | 119 | 126 | $113\frac{2}{5}$ |
| 63 | Early Dawson........ | 39 | 14 | 71 | 26 | 65 | 20 | 68 | 8 | 49 | 14 | 58 | 30 | 93 | 112 | 98 | 105 | 124 | $106\frac{2}{5}$ |
| 64 | Black Mesdag........ | 38 | 28 | 75 | 10 | 69 | 14 | 65 | 30 | 48 | 8 | 59 | 18 | 93 | 107 | 92 | 105 | 118 | 103 |
| 65 | Mortgage Lifter........ | 38 | 28 | 71 | 26 | 72 | 22 | 68 | 8 | 65 | 30 | 63 | 16 | 94 | 112 | 92 | 105 | 119 | $104\frac{2}{5}$ |
| 66 | Coulommiers........ | 35 | 30 | 71 | 26 | 84 | 24 | 66 | 16 | 65 | 30 | 64 | 32 | 98 | 123 | 113 | 120 | 126 | 116 |
| 67 | Pense ........ | 35 | 10 | 85 | 30 | 78 | 8 | 70 | 20 | 71 | 26 | 68 | 12 | 98 | 116 | 109 | 119 | 126 | $113\frac{3}{5}$ |
| 68 | Welcome........ | 35 | 10 | 81 | 6 | 86 | 26 | 88 | 8 | 55 | 10 | 69 | 12 | 92 | 113 | 96 | 102 | 125 | $105\frac{3}{5}$ |
| 69 | Imported Irish........ | 34 | 24 | 82 | 12 | 84 | 14 | 86 | 16 | 51 | 16 | 67 | 30 | 92 | 106 | 99 | 102 | 116 | 103 |
| 70 | Prize Cluster........ | 31 | 26 | 76 | 16 | 76 | 6 | 78 | 32 | 46 | 16 | 61 | 33 | 94 | 107 | 96 | 102 | 121 | 105 |
| 71 | Doncaster Prize........ | 25 | 10 | 85 | 30 | 57 | 22 | 76 | 16 | 67 | 2 | 62 | 16 | 99 | 115 | 100 | 113 | 120 | $109\frac{2}{5}$ |

The twelve varieties of oats which have produced the largest crops during 1899 at the several experimental farms are the following:—

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Thousand Dollar........ | 74 | 4 | 7. American Triumph........ | 65 | 30 |
| 2. Golden Giant........ | 68 | 8 | 8 Danish Island........ | 65 | 30 |
| 3. Holstein Prolific........ | 67 | 22 | 9. American Beauty........ | 64 | 24 |
| 4. Poland........ | 67 | 2 | 10. Columbus........ | 64 | 24 |
| 5. New Zealand........ | 66 | 16 | 11. White Giant........ | 64 | 24 |
| 6. Banner........ | 65 | 30 | 12. Prolific Black Tartarian... | 61 | 26 |

An average crop for the twelve sorts of 66 bushels 14 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. California Prolific Black, imported 1899........ | 104 | 24 | 7. Black Tartarian, imported 1899........ | 94 | 4 |
| 2. Oderbruch........ | 98 | 28 | 8. Wallis........ | 94 | 32 |
| 3. Siberian O. A. C........ | 96 | 16 | 9. Lincoln........ | 92 | 32 |
| 4. Cream Egyptian........ | 95 | 10 | 10. Abyssinia........ | 91 | 26 |
| 5. White Russian........ | 94 | 4 | 11. New Zealand........ | 91 | 28 |
| 6. Early Golden Prolific........ | 94 | 4 | 12. Salines (Vilmorin)........ | 91 | 26 |

An average crop of 95 bushels 2 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Miller | 113 | 18 | 8. King | 105 | 20 |
| 2. Banner | 110 | 10 | 9. Wide Awake | 103 | 28 |
| 3. Buckbee's Illinois | 109 | 24 | 10. Golden Beauty | 102 | 12 |
| 4. American Beauty | 108 | 28 | 11. Improved Ligowo, imported 1899 | 100 | 20 |
| 5. Early Maine | 107 | 22 | 12. Early Archangel | 98 | 28 |
| 6. Hazlett's Seizure | 106 | 16 | | | |
| 7. Poland | 105 | 20 | | | |

An average crop of 106 bushels 3 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Beauty | 97 | 22 | 7. American Triumph | 93 | 18 |
| 2. Abundance | 97 | 2 | 8. Joanette | 91 | 6 |
| 3. Holstein Prolific | 97 | 2 | 9. Black Beauty | 90 | 20 |
| 4. Bavarian | 96 | 16 | 10. King | 90 | .. |
| 5. Banner | 95 | 30 | 11. Wide Awake | 90 | .. |
| 6. New Zealand | 95 | 10 | 12. Columbus | 88 | 28 |

An average crop of 93 bushels 21 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. California Prolific Black, imported 1899 | 91 | 6 | 7. Prolific Blk. Tartarian | 78 | 2 |
| 2. Miller | 89 | 14 | 8. Golden Giant | 76 | 16 |
| 3. Salines | 83 | 18 | 9. Golden Tartarian | 76 | 16 |
| 4. New Zealand | 83 | 4 | 10. Abyssinia | 75 | 33 |
| 5. Blk. Tartarian, imported 1899 | 78 | 28 | 11. Early Blossom | 75 | 16 |
| 6. King | 78 | 14 | 12. Russell | 74 | 4 |

An average crop of 80 bushels 3 lbs. per acre.

The twelve varieties of oats which have produced the largest crops in 1899 taking the average results obtained on all the experimental farms are:

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Beauty | 85 | 15 | 8. California Prolific Blk., imported 1899 | 79 | 32 |
| 2. Banner | 85 | 11 | 9. Wide Awake | 79 | 18 |
| 3. Miller | 84 | 16 | 10. Salines | 79 | 10 |
| 4. New Zealand | 84 | 3 | 11. Early Maine | 79 | 2 |
| 5. Holstein Prolific | 82 | 17 | 12. Poland | 78 | 25 |
| 6. Danish Island | 81 | 18 | | | |
| 7. Blk. Tartarian, imported 1899 | 80 | .. | | | |

An average crop of 81 bushels 22 lbs. per acre.

The average crop of all the varieties of oats tested at each of the experimental farms in 1899 was as follows:—At Ottawa, 50 bushels 15 lbs. per acre; Nappan, 82 bushels 2 lbs.; Brandon, 86 bushels 2 lbs.; Indian Head, 80 bushels 7 lbs., and at Agassiz, 64 bushels 20 lbs. The average return given by the whole of the varieties of oats tested at all the farms was 72 bushels 23 lbs. per acre.

## TRIAL PLOTS OF BARLEY.

Fifty-one varieties of barley have been tested in the trial plots during 1899, including twenty-one different sorts of two-rowed barley and thirty of six-rowed. Among the two-rowed sorts there are fourteen hybrid varieties which have been produced at the experimental farms, namely, Sidney, Beaver, Fulton, Leslie, Monck, Nepean, Logan, Dunham, Clifford, Victor, Jarvis, Pacer, Bolton and Harvey. Among the six-rowed sorts there are seventeen of these hybrids, namely, Claude, Pioneer, Royal, Nugent, Trooper, Summit, Yale, Vanguard, Stella, Argyle, Mansfield, Garfield, Brome, Phœnix, Empire, Albert and Surprise.

The barley plots were of the same size as those sown with oats. The quantity of seed used in each case was at the rate of two bushels per acre, and the dates of sowing were as follows: At Ottawa, May 1 and 2; Nappan, May 11; Brandon, May 18 and 19; Indian Head, May 24; and at Agassiz on April 25.

### UNIFORM TEST-PLOTS OF TWO-ROWED BARLEY.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1899. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Sidney | 50 | .. | 43 | 16 | 53 | 6 | 63 | 36 | 36 | 49 | 49 | 21 | 94 | 105 | 85 | 104 | 121 | $101\frac{4}{5}$ |
| 2 | Beaver | 49 | 8 | 55 | 40 | 52 | 24 | 55 | 20 | 31 | 12 | 48 | 40 | 94 | 103 | 95 | 103 | 114 | $101\frac{4}{5}$ |
| 3 | French Chevalier | 47 | 24 | 64 | 8 | 60 | 40 | 65 | 40 | 30 | .. | 53 | 32 | 95 | 104 | 95 | 105 | 115 | $102\frac{4}{5}$ |
| 4 | Danish Chevalier | 47 | 4 | 49 | 8 | 50 | 30 | 66 | 32 | 33 | 36 | 49 | 22 | 95 | 105 | 99 | 104 | 122 | 105 |
| 5 | Canadian Thorpe | 46 | 32 | 50 | 40 | 49 | 38 | 58 | 36 | 36 | 32 | 48 | 26 | 93 | 104 | 94 | 98 | 115 | $100\frac{4}{5}$ |
| 6 | Fulton | 46 | 32 | 44 | 8 | 62 | 4 | 50 | .. | 32 | 44 | 47 | 8 | 89 | 105 | 92 | 98 | 115 | $99\frac{4}{5}$ |
| 7 | Leslie | 45 | 40 | 44 | 8 | 55 | .. | 55 | 40 | 33 | 26 | 46 | 42 | 89 | 105 | 92 | 95 | 114 | 99 |
| 8 | Monck | 45 | 20 | 47 | 24 | 46 | 2 | 48 | 36 | 30 | 40 | 43 | 34 | 95 | 105 | 92 | 103 | 121 | $103\frac{1}{5}$ |
| 9 | Nepean | 45 | 20 | 50 | 40 | 58 | 16 | 50 | .. | 35 | 40 | 48 | 4 | 89 | 105 | 88 | 98 | 115 | 99 |
| 10 | Logan | 45 | 20 | 44 | 8 | 68 | 6 | 49 | 8 | 35 | 40 | 48 | 26 | 89 | 105 | 88 | 95 | 114 | $98\frac{1}{5}$ |
| 11 | Dunham | 45 | .. | 45 | 40 | 63 | 36 | 57 | 4 | 34 | 8 | 49 | 8 | 89 | 105 | 88 | 98 | 115 | 99 |
| 12 | Clifford | 44 | 28 | 50 | 40 | 56 | 32 | 49 | 28 | 34 | 8 | 47 | 8 | 89 | 105 | 89 | 98 | 114 | 99 |
| 13 | Victor | 44 | 28 | 47 | 24 | 59 | 28 | 53 | 16 | 34 | 28 | 47 | 44 | 90 | 105 | 88 | 98 | 114 | 99 |
| 14 | Jarvis | 44 | 8 | 51 | 32 | 55 | 40 | 51 | 12 | 35 | .. | 47 | 28 | 89 | 105 | 89 | 98 | 115 | $99\frac{1}{5}$ |
| 15 | Pacer | 41 | 42 | 40 | 40 | 47 | 24 | 45 | 20 | 30 | 20 | 41 | 10 | 89 | 103 | 92 | 98 | 123 | 101 |
| 16 | Bolton | 38 | 16 | 44 | 8 | 62 | 4 | 58 | 16 | 33 | 16 | 47 | 12 | 89 | 103 | 88 | 98 | 115 | $98\frac{3}{5}$ |
| 17 | Kinver Chevalier | 35 | 20 | 44 | 8 | 56 | 12 | 55 | .. | 29 | 8 | 44 | .. | 98 | 105 | 99 | 113 | 121 | $107\frac{1}{5}$ |
| 18 | Improved Thanet | 33 | 16 | 41 | 32 | 44 | 18 | 57 | 4 | 23 | 36 | 40 | 2 | 98 | 105 | 92 | 113 | 123 | $106\frac{1}{5}$ |
| 19 | Newton | 30 | 40 | 57 | 24 | 61 | 2 | 43 | 16 | 39 | 8 | 46 | 18 | 98 | 105 | 95 | 98 | 114 | 102 |
| 20 | Harvey | 30 | .. | 53 | 16 | 64 | 28 | 49 | 28 | 35 | .. | 46 | 24 | 89 | 104 | 92 | 98 | 115 | $99\frac{3}{5}$ |
| 21 | Prize Prolific | 28 | 36 | 42 | 24 | 56 | 22 | 56 | 32 | 30 | 40 | 43 | 2 | 99 | 105 | 99 | 113 | 121 | $105\frac{2}{5}$ |

The six varieties of two-rowed barley which have given the largest crops at the several experimental farms during 1899, are the following:—

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Sidney | 50 | .. | 4. Danish Chevalier | 47 | 4 |
| 2. Beaver | 49 | 8 | 5. Canadian Thorpe | 46 | 32 |
| 3. French Chevalier | 47 | 24 | 6. Fulton | 46 | 32 |

An average crop of 47 bushels 40 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 64 | 8 | 4. Harvey | 53 | 16 |
| 2. Newton | 57 | 24 | 5. Jarvis | 51 | 32 |
| 3. Beaver | 55 | 40 | 6. Nepean | 50 | 40 |

An average crop of 55 bushels 26 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Logan | 68 | 6 | 4. Bolton | 62 | 4 |
| 2. Harvey | 64 | 28 | 5. Fulton | 62 | 4 |
| 3. Dunham | 63 | 36 | 6. Newton | 61 | 2 |

An average crop of 63 bushels 29 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Chevalier | 66 | 32 | 4. Canadian Thorpe | 58 | 36 |
| 2. French Chevalier | 65 | 40 | 5. Bolton | 58 | 16 |
| 3. Sidney | 63 | 36 | 6. Dunham | 57 | 4 |

An average crop of 61 bushels 35 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Newton | 39 | 8 | 4. Nepean | 35 | 40 |
| 2. Canadian Thorpe | 36 | 32 | 5. Jarvis | 35 | .. |
| 3. Logan | 35 | 40 | 6. Harvey | 35 | .. |

An average crop of 36 bushels 12 lbs. per acre.

The six varieties of two-rowed barley which have given the largest crops in 1899, taking the average of the results obtained on all the experimental farms, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 53 | 32 | 4. Dunham | 49 | 8 |
| 2. Danish Chevalier | 49 | 22 | 5. Beaver | 48 | 40 |
| 3. Sidney | 49 | 21 | 6. Canadian Thorpe | 48 | 26 |

An average crop of 49 bushels 41 lbs. per acre.

The average crop of all the varieties of two-rowed barley tested at each of the experimental farms in 1899 was as follows:—At Ottawa, 42 bushels 12 lbs. per acre; Nappan, 48 bushels 14 lbs.; Brandon, 56 bushels 19 lbs.; Indian head, 54 bushels 15 lbs.; and at Agassiz, 33 bushels 10 lbs. per acre. The average return given by the whole of the varieties at all the farms was 46 bushels 43 lbs. per acre.

## UNIFORM TEST PLOTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1899. Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Number of Days from Sowing to Harvesting. Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Common | 52 | 24 | 34 | 8 | 55 | 40 | 58 | 16 | 30 | 40 | 46 | 16 | 84 | 97 | 80 | 92 | 119 | 94 2/5 |
| 2 | Claude | 52 | .. | 45 | 40 | 67 | 4 | 69 | 8 | 32 | 34 | 53 | 17 | 87 | 103 | 94 | 99 | 113 | 99 1/5 |
| 3 | Pioneer | 50 | 40 | 35 | 40 | 56 | 42 | 56 | 12 | 33 | 16 | 46 | 30 | 88 | 97 | 92 | 99 | 109 | 97 |
| 4 | Petschora | 50 | 40 | 45 | .. | 53 | 6 | 60 | .. | 32 | 14 | 48 | 12 | 84 | 98 | 85 | 93 | 109 | 93 4/5 |
| 5 | Rennie's Improved | 50 | 20 | 44 | 8 | 53 | 46 | 69 | 28 | 30 | .. | 49 | 30 | 84 | 98 | 82 | 92 | 109 | 93 |
| 6 | Royal | 50 | .. | 36 | 32 | 61 | 42 | 60 | .. | 34 | 28 | 48 | 30 | 84 | 98 | 83 | 93 | 106 | 92 4/5 |
| 7 | Nugent | 50 | . | 45 | .. | 61 | 22 | 55 | .. | 40 | | 50 | 14 | 87 | 103 | 92 | 94 | 113 | 97 4/5 |
| 8 | Trooper | 49 | 8 | 38 | 16 | 65 | 40 | 69 | 8 | 32 | 44 | 51 | 4 | 85 | 102 | 90 | 94 | 122 | 98 3/5 |
| 9 | Oderbruch | 49 | 8 | 43 | 16 | 55 | 40 | 58 | 36 | 40 | 20 | 49 | 24 | 86 | 102 | 85 | 93 | 109 | 95 |
| 10 | Summit | 48 | 16 | 41 | 32 | 66 | 12 | 62 | 24 | 32 | 44 | 50 | 16 | 91 | 103 | 89 | 94 | 114 | 98 1/5 |
| 11 | Odessa | 47 | 44 | 45 | 40 | 52 | 14 | 61 | 12 | 32 | 4 | 47 | 42 | 85 | 97 | 87 | 94 | 109 | 94 2/5 |
| 12 | Yale | 47 | 24 | 50 | 40 | 53 | 16 | 58 | 36 | 35 | 10 | 49 | 6 | 91 | 102 | 94 | 99 | 109 | 99 |
| 13 | Vanguard | 47 | 4 | 50 | . | 58 | 36 | 55 | . | 31 | 12 | 48 | 20 | 85 | 103 | 86 | 92 | 109 | 95 |
| 14 | Stella | 46 | 32 | 45 | .. | 56 | 42 | 61 | 12 | 35 | 20 | 49 | 2 | 84 | 103 | 88 | 94 | 114 | 96 3/5 |
| 15 | Hulless Black | 46 | 32 | 40 | 40 | 44 | 8 | 44 | 40 | 29 | 8 | 41 | 6 | 84 | 99 | 88 | 93 | 109 | 94 3/5 |
| 16 | Argyle | 46 | 12 | 59 | 8 | 63 | 36 | 68 | 36 | 37 | 44 | 55 | 8 | 87 | 97 | 86 | 94 | 109 | 94 3/5 |
| 17 | Blue Long-head | 46 | 12 | 56 | 32 | 46 | 32 | 65 | 40 | 32 | 24 | 49 | 28 | 87 | 97 | 87 | 93 | 113 | 95 2/5 |
| 18 | Mansfield | 45 | 20 | 50 | 40 | 64 | 38 | 66 | 32 | 33 | 16 | 52 | 10 | 87 | 99 | 86 | 94 | 108 | 94 4/5 |
| 19 | Mensury | 44 | 8 | 55 | 40 | 58 | 16 | 62 | 4 | 38 | 16 | 51 | 36 | 88 | 98 | 86 | 93 | 109 | 94 4/5 |
| 20 | Garfield | 43 | 16 | 55 | .. | 51 | 32 | 55 | 40 | 33 | 36 | 47 | 44 | 87 | 98 | 94 | 104 | 109 | 98 2/5 |
| 21 | Success | 41 | 32 | 35 | 40 | 41 | 32 | 50 | .. | 32 | 24 | 40 | 16 | 78 | 95 | 83 | 85 | 104 | 89 |
| 22 | Brome | 41 | 12 | 50 | . | 48 | 16 | 57 | 24 | 34 | 8 | 46 | 12 | 91 | 103 | 94 | 105 | 114 | 101 2/5 |
| 23 | Champion | 40 | 40 | 36 | 32 | 47 | 24 | 46 | 12 | 36 | 22 | 41 | 26 | 85 | 95 | 85 | 89 | 108 | 92 2/5 |
| 24 | Phœnix | 40 | .. | 35 | 40 | 53 | 26 | 60 | 20 | 35 | 30 | 45 | 4 | 85 | 97 | 86 | 92 | 111 | 94 1/5 |
| 25 | Baxter | 38 | 16 | 55 | 40 | 53 | 26 | 63 | 36 | 40 | 40 | 50 | 22 | 87 | 97 | 82 | 93 | 113 | 94 2/5 |
| 26 | Excelsior | 36 | 32 | 26 | 32 | 46 | 32 | 55 | 40 | 32 | 34 | 39 | 34 | 80 | 96 | 79 | 89 | 109 | 90 4/5 |
| 27 | Hulless White | 35 | 40 | 35 | .. | 34 | 8 | 40 | 20 | 16 | 32 | 32 | 20 | 85 | 96 | 88 | 92 | 119 | 96 |
| 28 | Empire | 34 | 8 | 39 | 8 | 57 | 44 | 61 | 12 | 33 | 36 | 45 | 12 | 86 | 103 | 89 | 94 | 120 | 98 2/5 |
| 29 | Albert | 34 | 8 | 44 | 8 | 48 | 16 | 50 | 40 | 40 | 30 | 43 | 30 | 88 | 99 | 86 | 99 | 107 | 95 4/5 |
| 30 | Surprise | 30 | 40 | 42 | 24 | 58 | 26 | 56 | 12 | 34 | 18 | 44 | 28 | 88 | 103 | 88 | 93 | 115 | 97 2/5 |

The six varieties of six-rowed barley which have given the largest crops at the several experimental farms during 1899, are the following:

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Common | 52 | 24 | 4. Petschora | 50 | 40 |
| 2. Claude | 52 | — | 5. Rennie's Improved | 50 | 20 |
| 3. Pioneer | 50 | 40 | 6. Royal | 50 | — |

An average crop of 51 bushels 4 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Argyle | 59 | 8 | 4. Baxter | 55 | 40 |
| 2. Blue Long-head | 56 | 32 | 5. Garfield | 55 | |
| 3. Mensury | 55 | 40 | 6. Mansfield | 50 | 40 |

An average crop of 55 bushels 26 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Claude | 67 | 4 | 4. Mansfield | 64 | 38 |
| 2. Summit | 66 | 12 | 5. Argyle | 63 | 36 |
| 3. Trooper | 65 | 40 | 6. Royal | 61 | 42 |

An average crop of 64 bushels 44 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Rennie's Improved | 69 | 28 | 4. Argyle | 68 | 36 |
| 2. Trooper | 69 | 8 | 5. Mansfield | 66 | 32 |
| 3. Claude | 69 | 8 | 6. Blue Long-head | 65 | 40 |

An average crop of 68 bushels 9 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Baxter | 40 | 40 | 4. Nugent | 40 | — |
| 2. Albert | 40 | 30 | 5. Mensury | 38 | 16 |
| 3. Oderbruch | 40 | 20 | 6. Argyle | 37 | 44 |

An average crop of 39 bushels 33 lbs. per acre.

The six varieties of six-rowed barley which have given the largest crops in 1899, taking the average of the results obtained on all the experimental farms are :—

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Argyle | 55 | 8 | 4. Mensury | 51 | 36 |
| 2. Claude | 53 | 17 | 5. Trooper | 51 | 4 |
| 3. Mansfield | 52 | 10 | 6. Baxter | 50 | 22 |

An average crop of 52 bushels 16 lbs. per acre.

The average crop of all the varieties of six-rowed barley tested at each of the experimental farms in 1899, was as follows : at Ottawa, 44 bushels 29 lbs. per acre ; Nappan, 44 bushels 2 lbs. ; Brandon, 54 bushels 30 lbs. ; Indian Head, 58 bushels 34 lbs. ; and at Agassiz 34 bushels 3 lbs. The average return given by the whole of the varieties at all the farms was 47 bushels 10 lbs. per acre.

## TRIAL PLOTS OF SPRING WHEAT.

Fifty-two varieties of spring wheat have been grown on the uniform test plots for 1899. Among these there are thirty cross-bred sorts which have been produced at the experimental farms. These are Preston, Laurel, Vernon, Captor, Stanley, Percy, Rideau, Admiral, Beauty, Progress, Weldon, Crown, Harold, Huron, Blenheim, Alpha, Clyde, Countess, Fraser, Ebert, Crawford, Advance, Dufferin, Blair, Mason, Plumper, Early Riga, Dawn, Byron and Norval. The size of the plots in each case was the same as those of the oats, and the quantity of seed sown was in the proportion of one and one-half bushels per acre. The dates of sowing were as follows :—At Ottawa April 28 and 29 ; Nappan May 6 ; Brandon April 29 to May 1 ; Indian Head April 27 ; and at Agassiz April 15.

UNIFORM TEST PLOTS OF SPRING WHEAT.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1899. Ottawa, Ont. | | Nappan, N. S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B. C. | | Average of all Farms. | | Number of Days from Sowing to Harvesting. Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Preston | 33 | 20 | 37 | 20 | 38 | 40 | 33 | 20 | 31 | 10 | 34 | 46 | 98 | 119 | 112 | 131 | 129 | 117 4/5 |
| 2 | Wellman's Fife | 32 | 40 | 45 | . | 40 | 10 | 36 | 20 | 29 | 20 | 36 | 42 | 102 | 122 | 120 | 133 | 129 | 121 1/5 |
| 3 | Hungarian | 31 | 20 | 48 | 40 | 37 | 30 | 34 | 40 | 31 | .. | 36 | 38 | 99 | 119 | 118 | 131 | 129 | 119 1/5 |
| 4 | Emporium | 31 | .. | 31 | 20 | 35 | 10 | 30 | .. | 24 | 40 | 30 | 26 | 101 | 119 | 119 | 131 | 126 | 119 1/5 |
| 5 | Roumanian | 30 | 40 | 48 | 40 | 54 | 20 | 34 | 20 | 30 | 40 | 39 | 44 | 106 | 121 | 121 | 129 | 125 | 120 2/5 |
| 6 | Rio Grande | 29 | .. | 40 | .. | 39 | 40 | 34 | 20 | 28 | 40 | 34 | 20 | 101 | 118 | 118 | 129 | 125 | 118 1/5 |
| 7 | Colorado | 28 | 20 | 39 | 20 | 32 | 40 | 26 | 20 | 26 | 10 | 30 | 34 | 99 | 117 | 113 | 122 | 126 | 115 2/5 |
| 8 | Laurel | 28 | 20 | 44 | 40 | 44 | .. | 29 | 40 | 21 | 30 | 33 | 38 | 102 | 121 | 121 | 132 | 126 | 120 2/5 |
| 9 | Pringle's Champlain | 28 | .. | 40 | 40 | 41 | .. | 33 | 20 | 27 | .. | 34 | .. | 101 | 119 | 118 | 127 | 129 | 118 4/5 |
| 10 | Monarch | 27 | .. | 38 | 40 | 39 | 40 | 34 | 20 | 34 | 20 | 34 | 48 | 102 | 122 | 121 | 131 | 129 | 121 |
| 11 | White Connell | 27 | . | 41 | 20 | 38 | 30 | 32 | .. | 24 | 10 | 32 | 36 | 103 | 119 | 121 | 134 | 129 | 121 1/5 |
| 12 | White Fife | 27 | .. | 44 | 40 | 39 | .. | 33 | 40 | 24 | .. | 33 | 40 | 102 | 122 | 121 | 134 | 129 | 121 3/5 |
| 13 | White Russian | 26 | 40 | 40 | .. | 39 | 40 | 32 | . | 26 | 20 | 32 | 56 | 101 | 122 | 121 | 134 | 129 | 121 2/5 |
| 14 | Vernon | 26 | .. | 42 | .. | 32 | 50 | 17 | 40 | 24 | 40 | 28 | 38 | 98 | 114 | 115 | 122 | 125 | 114 4/5 |
| 15 | Captor | 25 | 40 | 38 | 40 | 37 | .. | 29 | 40 | 20 | 50 | 30 | 22 | 102 | 119 | 113 | 129 | 126 | 117 4/5 |
| 16 | Stanley | 25 | 20 | 32 | 40 | 36 | 20 | 33 | 20 | 28 | 20 | 31 | 12 | 99 | 119 | 113 | 131 | 126 | 117 3/5 |
| 17 | Red Fern | 25 | 20 | 30 | .. | 35 | .. | 38 | 20 | 31 | 20 | 32 | .. | 108 | 120 | 118 | 131 | 129 | 121 1/5 |
| 18 | Percy | 25 | 20 | 38 | 40 | 34 | 20 | 33 | .. | 25 | 20 | 31 | 20 | 100 | 118 | 109 | 131 | 125 | 116 3/5 |
| 19 | Rideau | 25 | 20 | 27 | 20 | 34 | 40 | 29 | 30 | 24 | 40 | 28 | 16 | 95 | 118 | 112 | 130 | 126 | 116 1/5 |
| 20 | Admiral | 25 | .. | 35 | 20 | 37 | 10 | 30 | 40 | 26 | 40 | 30 | 58 | 103 | 117 | 113 | 127 | 126 | 117 1/5 |
| 21 | Beauty | 24 | 40 | 32 | 40 | 34 | 40 | 29 | 40 | 23 | 20 | 29 | .. | 101 | 119 | 119 | 129 | 126 | 118 4/5 |
| 22 | Goose | 24 | 20 | 44 | . | 50 | 20 | 31 | 40 | 31 | .. | 36 | 16 | 106 | 118 | 122 | 131 | 126 | 120 3/5 |
| 23 | Dion's | 24 | 20 | 36 | 40 | 38 | .. | 35 | . | 30 | 10 | 32 | 50 | 108 | 118 | 118 | 131 | 126 | 120 1/5 |
| 24 | Progress | 24 | 20 | 35 | 20 | 36 | 20 | 32 | 40 | 27 | 40 | 31 | 16 | 96 | 118 | 112 | 131 | 129 | 117 1/5 |
| 25 | Weldon | 24 | 20 | 33 | 20 | 36 | .. | 27 | 20 | 30 | .. | 30 | 12 | 102 | 120 | 111 | 127 | 129 | 117 4/5 |
| 26 | Crown | 24 | .. | 34 | .. | 45 | 40 | 30 | 20 | 26 | .. | 32 | .. | 101 | 118 | 112 | 129 | 126 | 117 1/5 |
| 27 | Harold | 24 | .. | 31 | 20 | 37 | 20 | 19 | .. | 24 | . | 27 | 8 | 91 | 118 | 105 | 115 | 118 | 109 2/5 |
| 28 | Huron | 23 | 20 | 44 | . | 42 | 20 | 35 | .. | 34 | 20 | 35 | 48 | 98 | 118 | 112 | 130 | 125 | 116 3/5 |
| 29 | Blenheim | 23 | .. | 40 | 40 | 35 | .. | 33 | 40 | 26 | 20 | 31 | 44 | 101 | 118 | 113 | 131 | 129 | 118 2/5 |
| 30 | White Chaff, Campbell's | 22 | 40 | 32 | 40 | 35 | 20 | 20 | 40 | 26 | .. | 27 | 28 | 103 | 119 | 112 | 122 | 129 | 117 |
| 31 | Ladoga | 22 | 40 | 25 | 20 | 33 | .. | 26 | 40 | 25 | 20 | 26 | 36 | 95 | 112 | 110 | 122 | 126 | 113 |
| 32 | Alpha | 22 | 40 | 36 | 40 | 36 | .. | 38 | 20 | 25 | 40 | 31 | 52 | 101 | 118 | 111 | 127 | 129 | 117 1/5 |
| 33 | Clyde | 22 | . | 42 | .. | 36 | .. | 29 | 40 | 30 | 50 | 32 | 6 | 102 | 118 | 119 | 131 | 126 | 119 1/5 |
| 34 | Countess | 20 | 40 | 31 | 20 | 41 | 40 | 31 | 20 | 28 | . | 30 | 36 | 96 | 119 | 113 | 122 | 126 | 115 1/5 |
| 35 | Fraser | 19 | 40 | 33 | 20 | 38 | 40 | 24 | 20 | 21 | 40 | 27 | 32 | 95 | 120 | 105 | 115 | 119 | 110 4/5 |
| 36 | Red Swedish | 19 | 20 | 34 | .. | 30 | 20 | 24 | 20 | 28 | 40 | 27 | 20 | 99 | 120 | 120 | 131 | 126 | 119 1/5 |
| 37 | Red Fife | 18 | 40 | 37 | 20 | 38 | 30 | 39 | 40 | 31 | 30 | 33 | 8 | 102 | 119 | 121 | 131 | 129 | 120 2/5 |
| 38 | Ebert | 18 | 40 | 34 | . | 37 | 20 | 21 | 40 | 27 | 50 | 27 | 54 | 96 | 120 | 108 | 117 | 126 | 113 2/5 |
| 39 | Crawford | 18 | 20 | 34 | 40 | 39 | . | 29 | 40 | 26 | 50 | 29 | 42 | 102 | 121 | 110 | 117 | 118 | 113 3/5 |
| 40 | Beaudry | 17 | 20 | 40 | .. | 29 | 40 | 30 | 20 | 25 | . | 28 | 28 | 101 | 118 | 108 | 131 | 129 | 117 2/5 |
| 41 | Advance | 17 | .. | 39 | 20 | 40 | 30 | 29 | 20 | 27 | .. | 30 | 38 | 101 | 119 | 113 | 131 | 129 | 118 3/5 |
| 42 | Dufferin | 16 | 40 | 33 | 20 | 37 | 30 | 25 | 20 | 26 | 30 | 27 | 52 | 95 | 117 | 113 | 122 | 119 | 113 1/5 |
| 43 | Blair | 16 | 20 | 34 | .. | 37 | 20 | 33 | 20 | 27 | 50 | 29 | 46 | 100 | 118 | 111 | 117 | 126 | 114 2/5 |
| 44 | Herisson Bearded | 16 | .. | 44 | .. | 32 | 50 | 26 | 40 | 29 | .. | 29 | 42 | 101 | 118 | 118 | 127 | 129 | 118 3/5 |
| 45 | Black Sea | 16 | .. | 32 | .. | 34 | 40 | 22 | 20 | 28 | 50 | 26 | 46 | 95 | 112 | 109 | 131 | 125 | 114 2/5 |
| 46 | Mason | 16 | .. | 34 | .. | 37 | .. | 32 | 40 | 26 | 20 | 29 | 12 | 100 | 119 | 111 | 117 | 125 | 114 2/5 |
| 47 | Plumper | 15 | .. | 40 | 40 | 35 | 20 | 24 | 20 | 23 | 20 | 27 | 44 | 99 | 118 | 109 | 117 | 126 | 113 4/5 |
| 48 | Early Riga | 15 | .. | 34 | 40 | 37 | 20 | 20 | 20 | 24 | 20 | 26 | 20 | 92 | 114 | 101 | 115 | 118 | 108 |
| 49 | Dawn | 15 | .. | 34 | 40 | 43 | .. | 27 | 40 | 28 | 30 | 29 | 46 | 98 | 118 | 107 | 122 | 129 | 114 4/5 |
| 50 | Byron | 14 | 40 | 38 | 40 | 41 | 20 | 22 | 20 | 27 | 40 | 28 | 56 | 98 | 117 | 109 | 117 | 119 | 112 |
| 51 | Norval | 11 | 20 | 37 | 20 | 37 | 40 | 23 | .. | 27 | 40 | 27 | 24 | 101 | 117 | 109 | 117 | 119 | 112 3/5 |
| 52 | Golden Drop | 9 | 20 | 38 | 40 | 33 | 40 | 24 | 40 | 25 | 40 | 26 | 24 | 98 | 117 | 112 | 122 | 125 | 114 4/5 |

The twelve varieties of spring wheat which have given the largest crops at the several experimental farms during 1899, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 33 | 20 | 7. Laurel | 28 | 20 |
| 2. Wellman's Fife | 32 | 40 | 8. Colorado | 28 | 20 |
| 3. Hungarian | 31 | 20 | 9. Pringle's Champlain | 28 | — |
| 4. Emporium | 31 | — | 10. White Fife | 27 | — |
| 5. Roumanian | 30 | 40 | 11. White Connell | 27 | — |
| 6. Rio Grande | 29 | — | 12. Monarch | 27 | — |

An average crop of 29 bushels 28 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Hungarian | 48 | 40 | 7. Goose | 44 | — |
| 2. Roumanian | 48 | 40 | 8. Herisson Bearded | 44 | — |
| 3. Wellman's Fife | 45 | — | 9. Vernon | 42 | — |
| 4. White Fife | 44 | 40 | 10. Clyde | 42 | — |
| 5. Laurel | 44 | 40 | 11. White Connell | 41 | 20 |
| 6. Huron | 44 | — | 12. Blenheim | 40 | 40 |

An average crop of 44 bushels 8 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Roumanian | 54 | 20 | 7. Countess | 41 | 40 |
| 2. Goose | 50 | 20 | 8. Byron | 41 | 20 |
| 3. Crown | 45 | 40 | 9. Advance | 40 | 30 |
| 4. Laurel | 44 | — | 10. Wellman's Fife | 40 | 10 |
| 5. Dawn | 43 | — | 11. White Russian | 39 | 40 |
| 6. Huron | 42 | 20 | 12. Rio Grande | 39 | 40 |

An average crop of 43 bushels 33 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Fife | 39 | 40 | 7. Monarch | 34 | 20 |
| 2. Alpha | 38 | 20 | 8. Rio Grande | 34 | 20 |
| 3. Red Fern | 38 | 20 | 9. Roumanian | 34 | 20 |
| 4. Huron | 35 | | 10. White Fife | 33 | 40 |
| 5. Dions | 35 | — | 11. Blenheim | 33 | 40 |
| 6. Hungarian | 34 | 40 | 12. Preston | 33 | 20 |

An average crop of 35 bushels 23 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Monarch | 34 | 20 | 7. Goose | 31 | - |
| 2. Huron | 34 | 20 | 8. Clyde | 30 | 50 |
| 3. Red Fife | 31 | 30 | 9. Roumanian | 30 | 40 |
| 4. Red Fern | 31 | 20 | 10. Dion's | 30 | 10 |
| 5. Preston | 31 | 10 | 11. Weldon | 30 | — |
| 6. Hungarian | 31 | — | 12. Wellman's Fife | 29 | 20 |

An average crop of 31 bushels 18 lbs. per acre.

The twelve varieties of spring wheat which have given the largest crops in 1899; taking the average of the results obtained on all the experimental farms are—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Roumanian | 39 | 44 | 7. Preston | 34 | 46 |
| 2. Wellman's Fife | 36 | 42 | 8. Rio Grande | 34 | 20 |
| 3. Hungarian | 36 | 38 | 9. Pringle's Champlain | 34 | — |
| 4. Goose | 36 | 16 | 10. White Fife | 33 | 40 |
| 5. Huron | 35 | 48 | 11. Laurel | 33 | 38 |
| 6. Monarch | 34 | 48 | 12. Red Fife | 33 | 8 |

An average crop of 35 bushels 17 lbs. per acre.

The average crop of all the varieties of spring wheat tested at each of the experimental farms in 1899, was as follows : At Ottawa 22 bushels 36 lbs. per acre ; Nappan, 37 bushels 18 lbs. ; Brandon 37 bushels 49 lbs. ; Indian Head, 29 bushels 45 lbs. : and at Agassiz, 27 bushels 11 lbs. The average return given by the whole of the varieties of spring wheat at all the farms was 30 bushels 56 lbs. per acre.

## TRIAL PLOTS OF PEASE.

Fifty-six varieties of pease have been tested in the uniform trial plots during 1899. Among these there were thirty of the cross-bred sorts which have been originated at the experimental farms. These are Nelson, Vincent, Arthur, Agnes, Archer, Carleton, Alma, Duke, Prince, Fenton, Pearl, Kent, Lanark, Picton, King, Mackay, Bruce, Dover, Cooper, Perth, Macoun, Gregory, Herald, Elder, Elliott, Fergus, Bright, Bedford, Trilby and Chelsea. These were sown at Ottawa, Nappan and Agassiz in plots of one-fortieth acre each, and at Brandon and Indian Head in plots of one-twentieth acre, and the quantity of seed used per acre has varied from two to three bushels, depending on the size of the pea. The dates of sowing were as follows :—At Ottawa May 3 ; Nappan, May 10 ; Brandon, May 8 to 11 ; Indian Head, May 10 ; and at Agassiz, on April 17.

No returns can be given of the crops of pease on the plots at Ottawa on account of an unfortunate occurrence. On the 21st of August when a large proportion of the varieties were cut and nearly ready to bring in, a sudden storm arose with a violent wind and before it was possible to rescue them, they were all blown to the opposite end of the field where they were so mixed that it was impossible to separate them.

## UNIFORM TEST PLOTS OF PEASE.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms Season of 1899. | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. |
| 1 | Nelson | 35 | 20 | 45 | .. | 25 | 40 | 32 | 50 | 34 | 42 | 120 | 103 | 116 | 119 | 114½ |
| 2 | English Grey | 34 | 40 | 35 | 10 | 26 | 40 | 36 | 20 | 33 | 12 | 121 | 118 | 107 | 115 | 115¼ |
| 3 | Centennial | 30 | 40 | 36 | 20 | 24 | 20 | 40 | .. | 32 | 50 | 123 | 107 | 118 | 121 | 117¼ |
| 4 | Early Britain | 29 | 20 | 44 | 20 | 26 | 40 | 38 | 20 | 34 | 40 | 121 | 110 | 104 | 113 | 112 |
| 5 | Oddfellow | 29 | 20 | 32 | 20 | 19 | 40 | 32 | 30 | 28 | 27 | 120 | 130 | 118 | 122 | 122½ |
| 6 | German White | 28 | 40 | 43 | 10 | 33 | 40 | 43 | 30 | 37 | 15 | 120 | 111 | 109 | 119 | 114¾ |
| 7 | Canadian Beauty | 28 | 40 | 42 | 50 | 17 | 20 | 37 | 10 | 31 | 30 | 121 | 130 | 121 | 116 | 122 |
| 8 | Vincent | 28 | .. | 38 | .. | 23 | 40 | 32 | 10 | 30 | 27 | 130 | 109 | 108 | 116 | 115¾ |
| 9 | French Canner | 28 | .. | 37 | 40 | 24 | 20 | 40 | .. | 32 | 30 | 120 | 103 | 107 | 114 | 111 |
| 10 | Arthur | 27 | 20 | 42 | 40 | 26 | 20 | 35 | 40 | 33 | .. | 120 | 106 | 109 | 116 | 112¾ |
| 11 | Agnes | 27 | 20 | 37 | 20 | 32 | 40 | 33 | 40 | 32 | 45 | 121 | 110 | 115 | 119 | 116¼ |
| 12 | Chancellor | 27 | 20 | 43 | .. | 31 | 40 | 37 | 40 | 34 | 55 | 120 | 102 | 107 | 124 | 113¼ |
| 13 | New Potter | 27 | .. | 45 | 20 | 20 | .. | 35 | .. | 31 | 50 | 122 | 126 | 112 | 113 | 118¼ |
| 14 | Archer | 26 | 40 | 51 | 30 | 34 | 20 | 32 | .. | 36 | 7 | 122 | 111 | 120 | 119 | 118 |
| 15 | Carleton | 26 | .. | 49 | 20 | 34 | 40 | 35 | 30 | 36 | 22 | 123 | 111 | 116 | 121 | 117¾ |
| 16 | Pride | 25 | 20 | 43 | 30 | 26 | .. | 40 | 20 | 33 | 47 | 119 | 103 | 108 | 119 | 112¼ |
| 17 | Alma | 25 | 20 | 42 | 20 | 14 | 40 | 34 | .. | 29 | 5 | 126 | 123 | 120 | 116 | 121¼ |
| 18 | Duke | 25 | 20 | 42 | .. | 25 | 40 | 39 | .. | 33 | .. | 131 | 124 | 115 | 122 | 123 |
| 19 | Elephant Blue | 25 | 20 | 37 | 40 | 22 | 40 | 31 | 20 | 29 | 15 | 128 | 112 | 119 | 117 | 119 |
| 20 | Prince | 24 | 40 | 32 | 20 | 27 | .. | 41 | 10 | 31 | 15 | 131 | 121 | 109 | 121 | 120½ |
| 21 | Fenton | 24 | 40 | 35 | 40 | 23 | .. | 36 | 10 | 29 | 52 | 119 | 114 | 119 | 119 | 117¾ |
| 22 | Pearl | 24 | 40 | 48 | 50 | 27 | 20 | 42 | 20 | 33 | 17 | 131 | 126 | 119 | 119 | 123¾ |
| 23 | Crown | 24 | 40 | 45 | 20 | 35 | 40 | 33 | .. | 34 | 40 | 119 | 109 | 111 | 115 | 113½ |
| 24 | Kent | 24 | .. | 44 | 40 | 22 | .. | 33 | 20 | 31 | .. | 131 | 121 | 114 | 121 | 121¾ |
| 25 | Lanark | 23 | 20 | 35 | 50 | 29 | 40 | 39 | 10 | 32 | .. | 119 | 111 | 109 | 120 | 114¾ |
| 26 | Mummy | 23 | 20 | 48 | 50 | 27 | .. | 41 | 20 | 32 | .. | 120 | 111 | 108 | 113 | 113 |
| 27 | Picton | 23 | 20 | 46 | 50 | 38 | .. | 39 | 30 | 36 | 55 | 121 | 111 | 121 | 114 | 116¾ |
| 28 | King | 23 | 20 | 44 | 10 | 26 | .. | 45 | 40 | 34 | 47 | 131 | 126 | 117 | 120 | 123½ |
| 29 | White Wonder | 22 | 40 | 51 | 30 | 30 | 20 | 40 | 40 | 36 | 17 | 120 | 116 | 109 | 112 | 114¼ |
| 30 | Paragon | 22 | 40 | 46 | 40 | 24 | 20 | 38 | 10 | 32 | 57 | 131 | 101 | 113 | 118 | 115¾ |
| 31 | Mackay | 22 | .. | 47 | .. | 19 | .. | 31 | 50 | 29 | 57 | 131 | 120 | 116 | 115 | 120½ |
| 32 | Daniel O'Rourke | 22 | .. | 42 | 40 | 26 | .. | 34 | 40 | 31 | 20 | 119 | 109 | 110 | 112 | 112½ |
| 33 | Black-eyed Marrowfat | 22 | .. | 45 | 30 | 21 | 20 | 39 | 20 | 32 | 2 | 121 | 114 | 116 | 120 | 117¾ |
| 34 | Large White Marrowfat | 21 | 20 | 38 | 30 | 22 | 40 | 38 | 40 | 30 | 17 | 128 | 129 | 120 | 122 | 124¾ |
| 35 | Bruce | 20 | 40 | 44 | 20 | 23 | 40 | 39 | 50 | 32 | 7 | 128 | 120 | 115 | 120 | 120¾ |
| 36 | Dover | 20 | 40 | 42 | .. | 34 | 10 | 40 | 10 | 34 | 15 | 131 | 117 | 120 | 121 | 122¼ |
| 37 | Cooper | 20 | .. | 37 | 40 | 25 | 20 | 28 | .. | 27 | 45 | 120 | 130 | 117 | 117 | 121 |
| 38 | Prussian Blue | 20 | .. | 49 | 40 | 30 | .. | 36 | 40 | 34 | 5 | 118 | 111 | 119 | 119 | 116¾ |
| 39 | Victoria | 20 | .. | 51 | .. | 22 | 40 | 47 | 20 | 35 | 15 | 128 | 121 | 121 | 121 | 122¾ |
| 40 | Perth | 18 | 40 | 42 | 40 | 22 | 20 | 28 | .. | 27 | 55 | 118 | 112 | 108 | 120 | 114½ |
| 41 | Macoun | 18 | 40 | 49 | 40 | 34 | 20 | 39 | 50 | 35 | 37 | 126 | 123 | 118 | 124 | 122¾ |
| 42 | Gregory | 18 | 40 | 38 | 20 | 31 | .. | 44 | 20 | 33 | 5 | 122 | 114 | 121 | 120 | 119¼ |
| 43 | Herald | 18 | 40 | 51 | .. | 29 | 10 | 39 | 40 | 34 | 37 | 131 | 121 | 119 | 110 | 120¼ |
| 44 | Prince Albert | 18 | .. | 42 | 50 | 25 | 40 | 38 | 20 | 31 | 27 | 122 | 114 | 118 | 118 | 118 |
| 45 | Elder | 18 | .. | 58 | 30 | 29 | 20 | 45 | 20 | 37 | 47 | 126 | 119 | 120 | 119 | 121 |
| 46 | Elliott | 17 | 20 | 45 | 30 | 28 | 20 | 41 | 40 | 33 | 12 | 128 | 120 | 115 | 119 | 120½ |
| 47 | Multiplier | 17 | 20 | 46 | 20 | 22 | 20 | 43 | .. | 32 | 15 | 119 | 116 | 117 | 115 | 116¾ |
| 48 | Fergus | 16 | 40 | 45 | 40 | 32 | 20 | 42 | .. | 34 | 10 | 123 | 114 | 122 | 121 | 120 |
| 49 | Bright | 16 | 40 | 36 | 30 | 18 | 40 | 38 | 30 | 27 | 35 | 128 | 129 | 118 | 124 | 124¾ |
| 50 | Bedford | 16 | 40 | 46 | .. | 27 | .. | 43 | 20 | 33 | 15 | 131 | 126 | 115 | 123 | 123¾ |
| 51 | Harrison's Glory | 16 | 40 | 34 | .. | 25 | 40 | 32 | .. | 27 | 5 | 123 | 104 | 119 | 113 | 114¾ |
| 52 | Trilby | 16 | 40 | 47 | .. | 34 | .. | 38 | .. | 33 | 55 | 126 | 129 | 118 | 120 | 123¼ |
| 53 | Golden Vine | 16 | .. | 48 | 50 | 26 | 20 | 42 | 40 | 33 | 27 | 122 | 110 | 110 | 113 | 113¾ |
| 54 | Creeper | 13 | 20 | 39 | 40 | 30 | 20 | 41 | .. | 31 | 5 | 123 | 106 | 109 | 114 | 113 |
| 55 | Chelsea | 13 | 20 | 56 | .. | 35 | .. | 36 | 40 | 35 | 15 | 120 | 119 | 120 | 120 | 119¾ |
| 56 | Wisconsin Blue | 13 | 20 | 52 | .. | 34 | 40 | 38 | .. | 34 | 30 | 122 | 123 | .... | 128 | 124¼ |

The twelve varieties of pease which have given the largest crops at the several experimental farms, omitting Ottawa, during 1899 are the following :—

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Nelson | 35 | 20 | 7. German White | 28 | 40 |
| 2. English Grey | 34 | 40 | 8. French Canner | 28 | |
| 3. Centennial | 30 | 40 | 9. Vincent | 28 | |
| 4. Early Britain | 29 | 20 | 10. Arthur | 27 | 20 |
| 5. Oddfellow | 29 | 20 | 11. Agnes | 27 | 20 |
| 6. Canadian Beauty | 28 | 40 | 12. Chancellor | 27 | 20 |

An average crop of 29 bushels 33 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Elder | 58 | 30 | 7. Victoria | 51 | |
| 2. Chelsea | 56 | | 8. Macoun | 49 | 40 |
| 3. Wisconsin Blue | 52 | | 9. Prussian Blue | 49 | 40 |
| 4. Archer | 51 | 30 | 10. Carleton | 49 | 20 |
| 5. White Wonder | 51 | 30 | 11. Pearl | 48 | 50 |
| 6. Herald | 51 | | 12. Mummy | 48 | 50 |

An average crop of 51 bushels 29 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Picton | 38 | | 7. Dover | 34 | 10 |
| 2. Crown | 35 | 40 | 8. Trilby | 34 | |
| 3. Chelsea | 35 | | 9. German White | 33 | 40 |
| 4. Carleton | 34 | 40 | 10. Agnes | 32 | 40 |
| 5. Macoun | 34 | 20 | 11. Fergus | 32 | 20 |
| 6. Archer | 34 | 20 | 12. Chancellor | 31 | 40 |

An average crop of 34 bushels 12 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Victoria | 47 | 20 | 7. Multiplier | 43 | |
| 2. King | 45 | 40 | 8. Golden Vine | 42 | 40 |
| 3. Elder | 45 | 20 | 9. Pearl | 42 | 20 |
| 4. Gregory | 44 | 20 | 10. Fergus | 42 | |
| 5. German White | 43 | 30 | 11. Elliott | 41 | 40 |
| 6. Bedford | 43 | 20 | 12. Mummy | 41 | 20 |

An average crop of 43 bushels 32 lbs. per acre.

The twelve varieties of pease which have given the largest crops in 1899, taking the average results obtained on all the experimental farms are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Elder | 37 | 47 | 7. Macoun | 35 | 37 |
| 2. German White | 37 | 15 | 8. Chelsea | 35 | 15 |
| 3. Picton | 36 | 55 | 9. Victoria | 35 | 15 |
| 4. Carleton | 36 | 22 | 10. Chancellor | 34 | 55 |
| 5. White Wonder | 36 | 17 | 11. King | 34 | 47 |
| 6. Archer | 36 | 7 | 12. Nelson | 34 | 42 |

An average crop of 35 bushels 56 lbs. per acre.

The average crop of all the varieties of pease tested at each of the experimental farms in 1899 was as follows :—At Nappan, 22 bushels 41 lbs.

per acre; Brandon, 43 bushels 43 lbs.; Indian Head, 26 bushels 58 lbs.; and at Agassiz, 37 bushels 58 lbs. The average return given by the whole of the varieties at all the farms, omitting Ottawa, was 32 bushels 50 lbs. per acre.

## TRIAL PLOTS OF INDIAN CORN.

Thirty-one varieties of Indian corn have been tested during 1899. These were planted on fairly uniform soil, in rows three feet apart, and the plants thinned out to six or eight inches apart in the rows. The dates of planting were as follows: at Ottawa, May 25; Nappan, May 31; Brandon, May 26; Indian Head, May 29 and at Agassiz on May 20.

All the plots were cut green and put into the silo for the winter feeding of stock. The dates of cutting were: at Ottawa, September 14; Nappan, September 26; Brandon, September 3; Indian Head, September 9 and at Agassiz on October 10. The yield per acre has been calculated in each case from the weight obtained from two rows, each 66 feet long.

### UNIFORM TEST PLOTS OF INDIAN CORN.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, Season of 1899. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B. C. | | Average of all Farms. | |
| | | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. |
| 1 | Angel of Midnight... | 25 | 600 | 12 | 1,300 | 17 | 1,860 | 9 | 1,030 | 21 | 1,450 | 17 | 848 |
| 2 | Red Cob Ensilage ... | 24 | 1,720 | 19 | 1,050 | 18 | 1,400 | 10 | 900 | 31 | 1,140 | 21 | 42 |
| 3 | Early Mastodon ..... | 24 | 1,500 | 14 | 50 | 20 | 40 | 12 | 200 | 16 | 1,990 | 17 | 1,156 |
| 4 | Extra Early Szekely. | 22 | 1,980 | 9 | 1,800 | 19 | 1,820 | 8 | 720 | 10 | 570 | 14 | 578 |
| 5 | White Cap Yellow Dent .... ........ | 22 | 1,320 | 12 | 200 | 14 | 1,920 | 6 | 1,750 | 21 | 760 | 15 | 1,190 |
| 6 | Canada White Flint.. | 22 | 1,100 | 14 | 1,700 | 17 | 1,200 | 12 | 420 | 17 | 540 | 16 | 1,792 |
| 7 | Sanford. ........ ... | 20 | 700 | 14 | 50 | 16 | 560 | 9 | 1,250 | 22 | 1,560 | 16 | 1,224 |
| 8 | Iowa Silver Mine.... | 20 | 260 | 14 | 600 | 17 | 1,640 | 6 | 1,750 | 17 | 320 | 15 | 514 |
| 9 | Champion White Pearl..... ....... | 19 | 1,600 | 10 | 900 | 26 | 1,900 | 9 | 1,800 | 27 | 1,000 | 18 | 1,840 |
| 10 | Country Gentleman.. | 19 | 1,160 | 9 | 1,250 | 13 | 1,400 | 5 | 1,000 | 20 | 920 | 14 | 1,546 |
| 11 | Selected Leaming... | 19 | 610 | 12 | 750 | 17 | 1,200 | 9 | 370 | 21 | 1,120 | 16 | 10 |
| 12 | Early Butler ........ | 19 | 500 | 10 | 1,450 | 14 | 1,040 | 11 | 770 | 23 | 1,520 | 15 | 1,856 |
| 13 | Cloud's Early Yellow | 18 | 1,400 | 10 | 350 | 19 | 1,600 | 10 | 1,450 | 26 | 1,790 | 17 | 518 |
| 14 | Evergreen Sugar..... | 18 | 960 | 12 | 200 | 18 | 300 | 10 | 900 | 17 | 210 | 15 | 514 |
| 15 | Compton's Early..... | 18 | 300 | 11 | 1,650 | 19 | 500 | 8 | 1,820 | 26 | 250 | 17 | 504 |
| 16 | Iowa Gold Mine..... | 18 | 300 | 9 | 1,800 | 15 | 1,240 | ........ | | 16 | 1,220 | 15 | 140 |
| 17 | Giant Prol. Ensilage. | 17 | 100 | 14 | 600 | 16 | 780 | 10 | 350 | 21 | 1,780 | 15 | 1,922 |
| 18 | Rural Thoroughbred White Flint....... | 16 | 1,000 | 11 | 1,100 | 17 | 100 | 10 | 350 | 17 | 1,200 | 14 | 1,150 |
| 19 | Mammoth Cuban.... | 15 | 1,900 | 11 | 1,650 | 20 | 920 | 9 | 1,250 | 21 | 1,450 | 15 | 1,834 |
| 20 | Pride of the North... | 15 | 1,900 | 13 | 950 | 12 | 1,300 | 9 | 700 | 26 | 580 | 15 | 1,086 |
| 21 | Pearce's Prolific...... | 15 | 800 | 9 | 1,250 | 17 | 1,860 | 10 | 570 | 23 | 1,300 | 15 | 756 |
| 22 | Kendall's Early Giant | 15 | 360 | 11 | .. .. | 15 | 1,240 | 8 | 1,380 | 16 | 1,440 | 13 | 1,684 |
| 23 | North Dakota White. | 15 | 250 | 11 | 1,100 | 16 | 1,000 | 10 | 1,350 | 21 | 900 | 15 | 120 |
| 24 | Mamm. 8 rowed Flint | 14 | 1,700 | 9 | 1,250 | 18 | 300 | 11 | 220 | 22 | 1,650 | 15 | 624 |
| 25 | Ruby Mexican...... | 14 | 270 | 11 | 1,100 | 15 | 1,680 | 9 | 480 | 17 | 1,090 | 13 | 1,324 |
| 26 | Longfellow .......... | 13 | 1,500 | 11 | 550 | 24 | 620 | 8 | 1,930 | 20 | 1,690 | 15 | 1,658 |
| 27 | King of the Earliest.. | 13 | 400 | 12 | 750 | 19 | 500 | 9 | 810 | 22 | 1,100 | 15 | 712 |
| 28 | Extra Early Huron.. | 12 | 1,300 | 11 | ..... | 11 | 220 | 6 | 1,200 | ......... | | 10 | 680 |
| 29 | Early Yellow Long Eared ..... ....... | 12 | 1,300 | 6 | 1,200 | 12 | 640 | 8 | 1,600 | 9 | 1,140 | 9 | 1,776 |
| 30 | Yellow Six Weeks... | 12 | 200 | 6 | 1,750 | 12 | 1,740 | 6 | 320 | 8 | 280 | 9 | 458 |
| 31 | Mitchell's Extra Early | 9 | 1,800 | 11 | ..... | 15 | 580 | 7 | 740 | ......... | | 10 | 1,780 |

The six varieties of Indian corn which have given the heaviest crops at the several experimental farms during 1899, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Angel of Midnight .... ..... | 25 | 600 | 4. Extra Early Szekely........ | 22 | 1,980 |
| 2. Red Cob Ensilage. ... ..... | 24 | 1,720 | 5. White Cap Yellow Dent.... | 22 | 1,320 |
| 3. Early Mastodon............ | 24 | 1,500 | 6. Canada White Flint........ | 22 | 1,100 |

An average crop of 23 tons 1,703 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| | | | 4. Canada White Flint.... ... | 14 | 1,700 |
| 1. Red Cob Ensilage..... ..... | 19 | 1,050 | 5. Rural Thoroughbred White Flint . . ...... ....... | 14 | 1,150 |
| 2. King of the Earliest ........ | 16 | 450 | | | |
| 3. North Dakota White........ | 15 | 800 | 6. Giant Prolific Ensilage. .... | 14 | 600 |

An average crop of 15 tons 1,625 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Champion White Pearl. .... | 26 | 1,900 | 4. Early Mastodon........... | 20 | 40 |
| 2. Longfellow................. | 24 | 620 | 5. Extra Early Szekely........ | 19 | 1,820 |
| 3. Mammoth Cuban .... ...... | 20 | 920 | 6. Cloud's Early Yellow. ... | 19 | 1,600 |

An average crop of 21 tons 1,816 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Canada White Flint......... | 12 | 420 | 4. Mammoth 8-rowed Flint.... | 11 | 220 |
| 2. Early Mastodon ............ | 12 | 200 | 5. Cloud's Early Yellow. ..... | 10 | 1,450 |
| 3. Early Butler .. ............ | 11 | 770 | 6. North Dakota White....... | 10 | 1,350 |

An average crop of 11 tons 735 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage. ...... .. | 31 | 1,140 | 4. Pride of the North ......... | 26 | 580 |
| 2. Champion White Pearl...... | 27 | 1,000 | 5. Compton's Early........... | 26 | 250 |
| 3. Cloud's Early Yellow........ | 26 | 1,790 | 6. Early Butler............... | 23 | 1,520 |

An average crop of 27 tons 46 lbs. per acre.

The six varieties of Indian Corn which have given the heaviest crops in 1899, taking the average of the results obtained on all the experimental farms, are as follows :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage........ . | 21 | 42 | 4. Angel of Midnight.......... | 17 | 848 |
| 2. Champion White Pearl..... | 18 | 1,840 | 5. Cloud's Early Yellow....... | 17 | 518 |
| 3. Early Mastodon............ | 17 | 1,156 | 6. Compton's Early.... ...... | 17 | 504 |

An average crop of 18 tons 484 lbs. per acre.

The average weight, cut green, of all the varieties of Indian Corn tested at each of the experimental farms in 1899, was as follows :—At Ottawa, 17 tons 1,444 lbs. per acre ; Nappan, 11 tons 1,366 lbs. ; Brandon, 17 tons 809 lbs.; Indian Head, 9 tons 579 lbs.; and at Agassiz, 20 tons 757 lbs. The average return given by the whole of the varieties at all the farms was 15 tons 591 lbs. per acre.

Fig. 1. Expimental plots of grain and roots at Brandon, Manitoba.

## TRIAL PLOTS OF TURNIPS.

Twenty-five varieties of turnips were tested during 1899, sown on drills or on the flat in rows $2\frac{1}{2}$ feet apart. Two sowings were made at each farm, the second two weeks later than the first. The dates of sowing in each case will be found in the accompanying table, the dates on which the roots were pulled were as follows :—At Ottawa, October 14 ; Nappan, October 25 ; Brandon, October 13 ; Indian Head, October 5 ; and at Agassiz, on October 24. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety. | Ottawa, Ont. Sown May 12. | Ottawa, Ont. Sown May 26. | Nappan, N.S. Sown May 23. | Nappan, N.S. Sown June 7. | Brandon, Man. Sown May 20. | Brandon, Man. Sown June 3. | Indian Head, N.W.T. Sown May 23. | Indian Head, N.W.T. Sown May 29. | Agassiz, B.C. Sown May 15. | Agassiz, B.C. Sown May 29. | Average of all Farms. First Sowing. | Average of all Farms. Second Sowing. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre. Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. |
| 1 | Purple Top Swede...... .. | 34 1,300 | 30 1,050 | 33 1,650 | 27 450 | 15 1,020 | 14 50 | 25 1,315 | 18 795 | 51 135 | 51 630 | 32 264 | 28 595 |
| 2 | Drummond Purple Top.... | 34 310 | 21 570 | 27 450 | 26 800 | 11 1,100 | 12 750 | 25 490 | 19 1,105 | 41 170 | 43 1,780 | 27 1,704 | 24 1,401 |
| 3 | Bangholm Selected ....... | 33 1,980 | 26 1,460 | 33 825 | 30 1,050 | 17 1,310 | 13 730 | 29 905 | 21 1,890 | 58 1,645 | 45 420 | 34 1,333 | 27 1,110 |
| 4 | Skirvings...... ........... | 33 1,980 | 30 1,710 | 30 555 | 29 200 | 17 980 | 15 690 | 23 530 | 20 590 | 44 945 | 42 975 | 29 1,798 | 27 1,233 |
| 5 | Prize Winner . .......... | 33 1,980 | 26 1,790 | 32 505 | 29 105 | 14 1,700 | 13 1,720 | 19 1,930 | 21 1,560 | 51 1,125 | 50 320 | 30 1,048 | 28 699 |
| 6 | Champion Purple Top..... | 33 1,485 | 30 720 | 33 1,650 | 26 1,625 | 21 1,230 | 16 1,990 | 21 240 | 18 1,455 | 27 1,770 | 27 615 | 27 1,275 | 24 81 |
| 7 | Selected Champion ........ | 33 1,320 | 27 1,440 | 27 1,675 | 26 800 | 15 1,020 | 14 1,370 | 23 1,025 | 22 1,870 | 53 1,910 | 48 855 | 30 1,790 | 28 67 |
| 8 | Imperial Swede.......... .. | 33 990 | 27 120 | 33 825 | 28 1,750 | 18 960 | 11 770 | 20 425 | 18 465 | 50 980 | 48 30 | 31 436 | 26 1,427 |
| 9 | Hardy Goliath ........... | 33 665 | 24 510 | 36 1,755 | 28 1,750 | 15 1,680 | 15 1,020 | 18 795 | 17 1,970 | 51 1,455 | 48 30 | 31 470 | 26 1,856 |
| 10 | Jumbo. .. ....... ...... | 33 660 | 27 110 | 31 700 | 28 595 | 10 790 | 11 770 | 23 1,685 | 16 1,660 | 38 725 | 37 580 | 27 912 | 24 343 |
| 11 | West Norfolk Red Top..... | 33 165 | 30 720 | 32 845 | 30 225 | 13 730 | 12 1,740 | 18 300 | 21 1,725 | 35 1,280 | 31 370 | 26 1,064 | 25 556 |
| 12 | Halewood's Bronze Top... | 33 165 | 30 1,050 | 37 250 | 25 1,950 | 16 1,500 | 12 1,740 | 27 285 | 21 240 | 50 1,640 | 48 1,680 | 32 1,968 | 27 1,732 |
| 13 | Hall's Westbury. ......... | 33 .... | 32 680 | 34 1,300 | 28 1,750 | 17 1,310 | 16 1,000 | 22 1,705 | 20 1,250 | 39 870 | 37 250 | 29 1,037 | 27 186 |
| 14 | Mammoth Clyde..... .... | 33 .... | 23 860 | 33 1,650 | 28 1,750 | 23 1,850 | 20 590 | 25 1,150 | 22 715 | 46 400 | 48 1,845 | 32 1,010 | 28 1,552 |
| 15 | East Lothian.... ......... | 32 680 | 24 510 | 33 825 | 30 225 | 17 320 | 11 1,100 | 20 1,085 | 21 1,560 | 52 610 | 47 1,040 | 31 304 | 27 87 |
| 16 | Shamrock Purple Top ... | 32 680 | 27 1,020 | 33 1,650 | 25 1,950 | 17 1,970 | 14 50 | 19 1,600 | 20 1,085 | 44 780 | 39 540 | 29 1,336 | 25 929 |
| 17 | Perfection Swede........ .. | 30 1,380 | 28 1,760 | 37 250 | 30 1,875 | 15 360 | 20 1,250 | 24 1,005 | 24 1,830 | 58 1,975 | 51 795 | 33 594 | 31 702 |
| 18 | Prize Purple Top.......... | 30 1,050 | 24 1,500 | 36 105 | 31 370 | 17 1,310 | 17 650 | 23 1,355 | 21 735 | 52 1,600 | 50 1,640 | 32 284 | 29 179 |
| 19 | New Arctic.......... ..... | 30 60 | 25 820 | 31 1,525 | 30 225 | 13 400 | 9 1,800 | 18 1,620 | 16 1,000 | 50 320 | 42 1,305 | 28 1,585 | 24 1,830 |
| 20 | Marquis of Lorne ... . .. | 29 1,400 | 22 880 | 32 350 | 26 800 | 9 480 | 12 420 | 22 1,540 | 16 1,330 | 46 1,720 | 40 1,840 | 28 298 | 23 1,454 |
| 21 | Carter's Elephant .... ... | 26 690 | 24 1,500 | 30 555 | 30 225 | 21 570 | 12 750 | 16 1,495 | 16 1,000 | 47 1,370 | 44 448 | 28 936 | 25 1,184 |
| 22 | Monarch.. ...... ...... .. | 24 840 | 21 900 | 36 105 | 31 1,195 | 18 1,950 | 10 1,450 | 16 835 | 17 1,310 | 34 1,630 | 31 370 | 26 272 | 22 1,045 |
| 23 | Giant King...... . ..... . | 21 1,890 | 21 900 | 30 555 | 25 1,975 | 13 1,720 | 11 1,100 | 20 1,250 | 17 1,640 | 46 895 | 55 880 | 26 1,262 | 26 1,299 |
| 24 | Sutton's Champion ....... | 21 1,130 | 18 1,950 | 26 1,625 | 25 655 | 10 790 | 9 1,800 | 15 1,515 | 22 1,705 | 56 1,190 | 46 1,555 | 26 450 | 24 1,533 |
| 25 | Hartley's Bronze .... .. | 18 630 | 19 1,600 | 33 825 | 27 1,605 | 22 880 | 18 1,290 | 21 1,560 | 21 1,065 | 45 90 | 43 1,450 | 28 397 | 26 602 |

The crops from the two sowings of turnips at the experimental farms in 1899, have averaged per acre as follows :—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 30 | 1,497 |
| " " second sowing | 25 | 1,925 |
| Experimental Farm, Nappan, first sowing | 32 | 1,160 |
| " " second sowing | 28 | 836 |
| " Brandon, first sowing | 16 | 637 |
| " " second sowing | 14 | 23 |
| " Indian Head, first sowing | 21 | 1,665 |
| " " second sowing | 15 | 1,898 |
| " Agassiz, first sowing | 48 | 1,410 |
| " " second sowing | 44 | 169 |

Average crop from all the plots at all the farms, first sowing, 30 tons 74 lbs. ; second sowing, 25 tons 1,370 lbs. per acre.

The six varieties of turnips which have given the heaviest crops at the several experimental farms during the season of 1899, are the following. (Where not otherwise stated, the quantities given are all from the early sown plots):—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Purple Top Swede | 34 | 1,300 | 4. Skirving's | 33 | 1,980 |
| 2. Drummond Purple Top | 34 | 310 | 5. Prize Winner | 33 | 1,980 |
| 3. Bangholm Selected | 33 | 1,980 | 6. Champion Purple Top | 33 | 1,485 |

An average crop of 34 tons 172 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Halewood's Bronze Top | 37 | 250 | 4. Prize Purple Top | 36 | 105 |
| 2. Perfection Swede | 37 | 250 | 5. Monarch | 36 | 105 |
| 3. Hardy Goliath | 36 | 1,755 | 6. Hall's Westbury | 34 | 1,300 |

An average crop of 36 tons 627 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mammoth Clyde | 23 | 1,850 | 4. Carter's Elephant | 21 | 570 |
| 2. Hartley's Bronze | 22 | 880 | 5. Perfection Swede (2nd sowing) | 20 | 1,250 |
| 3. Champion Purple Top | 21 | 1,230 | 6. Monarch | 18 | 1,950 |

An average crop of 21 tons 988 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Bangholm Selected | 29 | 905 | 4. Mammoth Clyde | 25 | 1,150 |
| 2. Halewood's Bronze Top | 27 | 285 | 5. Drummond Purple Top | 25 | 490 |
| 3. Purple Top Swede | 25 | 1,315 | 6. Perfection Swede | 24 | 1,830 |

An average crop of 26 tons 662 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Perfection Swede | 58 | 1,975 | 4. Giant King (2nd sowing) | 55 | 880 |
| 2. Bangholm Selected | 58 | 1,645 | 5. Selected Champion | 53 | 1,910 |
| 3. Sutton's Champion | 56 | 1,190 | 6. Prize Purple Top | 52 | 1,600 |

An average crop of 56 tons 200 lbs. per acre.

The six varieties of turnips which have produced the heaviest crops, in 1899, taking the average of the results obtained on all the experimental farms, are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Bangholm Selected .... .... | 34 | 1,333 | 4. Mammoth Clyde........ .... | 32 | 1,010 |
| 2. Perfection Swede.. . ...... | 33 | 594 | 5. Prize Purple Top..... ..... | 32 | 284 |
| 3. Halewood's Bronze Top...... | 32 | 1,968 | 6. Purple Top Swede..... .... | 32 | 264 |

An average crop of 32 tons 1,909 lbs. per acre.

The early sown plots have given this year the larger crops at all the experimental farms. The average results from all the farms show a difference of 4 tons 704 lbs. per acre in favour of the early sowings.

## TRIAL PLOTS OF MANGELS.

Twenty varieties of mangels have been under test during 1899, all sown on drills or on the flat, in rows, 2½ feet apart. Two sowings were made at each of the experimental farms, the second sowing two weeks later than the first, excepting that at Brandon where only one sowing was made. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following : at Ottawa, October 13 ; Nappan, October 10 and 11 ; Brandon, October 13 ; Indian Head, October 4 and at Agassiz on October 24. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 1. | | Sown May 25. | | Sown May 20. | | Sown June 5. | | Sown May 20. | | Sown May 23. | | Sown May 30. | | Sown April 24. | | Sown May 9. | | First Sowing. | | Second Sowing. | |
| | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | | Per acre. | |
| | | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. |
| 1 | Gate Post | 34 | 640 | 22 | 880 | 28 | 1,750 | 30 | 555 | 18 | 630 | 29 | 1,235 | 38 | 1,715 | 41 | 170 | 39 | 540 | 30 | 885 | 32 | 1,272 |
| 2 | Mamm. Long Red | 33 | 1,980 | 21 | 405 | 22 | 1,375 | 21 | 1,725 | 34 | 1,630 | 24 | 1,665 | 21 | 75 | 42 | 480 | 48 | 1,925 | 31 | 1,418 | 28 | 542 |
| 3 | Canadian Giant | 33 | 330 | 21 | 1,890 | 20 | 1,250 | 21 | 906 | 12 | 750 | 24 | 1,830 | 18 | 465 | 34 | 640 | 33 | 1,980 | 25 | 160 | 23 | 1,809 |
| 4 | Prize Mamm. Long Red | 33 | 330 | 20 | 260 | 21 | 75 | 22 | 550 | 33 | .... | 21 | 405 | 20 | 920 | 48 | 525 | 26 | 270 | 31 | 667 | 24 | 1,500 |
| 5 | Selected Mamm. Long Red | 33 | 330 | 18 | 300 | 21 | 1,725 | 28 | 925 | 32 | 1,010 | 29 | 80 | 20 | 1,085 | 41 | 1,160 | 33 | 1,650 | 31 | 1,261 | 25 | 490 |
| 6 | Giant Yellow Globe | 32 | 350 | 21 | 75 | 17 | 650 | 20 | 425 | 27 | 450 | 28 | 1,420 | 30 | 390 | 37 | 1,240 | 36 | 1,920 | 28 | 1,222 | 27 | 202 |
| 7 | Yellow Intermediate | 31 | 370 | 18 | 1,620 | 30 | 225 | 29 | 905 | 35 | 620 | 35 | 1,940 | 22 | 1,375 | 66 | 1,750 | 55 | 1,870 | 39 | 1,781 | 31 | 1,442 |
| 8 | Ward's Large Oval Shaped | 30 | 1,050 | 14 | 1,205 | 27 | 450 | 30 | 225 | 33 | 1,320 | 30 | 720 | 25 | 160 | 53 | 1,185 | 51 | 1,620 | 35 | 145 | 30 | 802 |
| 9 | Lion Yellow Intermediate | 30 | 60 | 19 | 1,765 | 20 | 1,250 | 30 | 225 | 34 | 640 | 25 | 820 | 26 | 1,295 | 51 | 300 | 47 | 1,855 | 32 | 614 | 31 | 285 |
| 10 | Giant Yellow Intermediate | 29 | 1,565 | 20 | 260 | 30 | 1,878 | 26 | 1,625 | 33 | 1,650 | 24 | 675 | 24 | 1,170 | 49 | 1,165 | 39 | 540 | 33 | 1,386 | 27 | 1,398 |
| 11 | Giant Yellow Half Long | 29 | 1,400 | 19 | 610 | 20 | 1,250 | 27 | 1,605 | 31 | 1,690 | 29 | 1,565 | 22 | 55 | 51 | 1,125 | 50 | 1,310 | 32 | 1,406 | 29 | 1,895 |
| 12 | Champion Yellow Globe | 27 | 1,450 | 16 | 1,660 | 18 | 1,125 | 17 | 1,475 | 8 | 1,490 | 32 | 1,340 | 18 | 795 | 24 | 1,830 | 24 | 1,005 | 22 | 1,047 | 19 | 484 |
| 13 | Mamm. Yellow Intermediate | 25 | 1,315 | 16 | 1,010 | 27 | 1,275 | 26 | 1,625 | 33 | .. | 24 | 1,335 | 19 | 1,270 | 41 | 1,160 | 33 | 1,650 | 30 | 1,017 | 24 | 389 |
| 14 | Gate Post Yellow | 25 | 820 | 14 | 215 | 18 | 1,125 | 17 | 1,475 | 11 | 1,700 | 17 | 1,475 | 18 | 1,455 | 38 | 1,388 | 37 | 250 | 23 | 101 | 21 | 1,849 |
| 15 | Mamm. Oval Shaped | 25 | 160 | 13 | 1,940 | 25 | 325 | 29 | 1,460 | 33 | 660 | 25 | 1,795 | 18 | 135 | 29 | 410 | 24 | 675 | 27 | 1,470 | 21 | 1,037 |
| 16 | Warden Orange Globe | 23 | 230 | 11 | 1,265 | 25 | 1,975 | 25 | 1,025 | 25 | 1,810 | 21 | 1,230 | 23 | 365 | 29 | 1,400 | 27 | 285 | 25 | 529 | 21 | 1,735 |
| 17 | Norbiton Giant | 23 | 200 | 15 | 360 | 29 | 1,400 | 29 | 1,100 | 35 | 620 | 27 | 1,275 | 31 | 535 | 25 | 1,180 | 28 | 1,420 | 28 | 595 | 26 | 429 |
| 18 | Yellow Fleshed Tankard | 20 | 1,250 | 15 | 695 | 16 | 1,825 | 20 | 95 | 31 | 700 | 30 | 885 | 18 | 795 | 41 | 500 | 42 | 975 | 28 | 232 | 24 | 140 |
| 19 | Golden Fleshed Tankard | 19 | 1,600 | 15 | 1,680 | 26 | 1,365 | 21 | 1,725 | 24 | 1,500 | 27 | 780 | 23 | 1,685 | 25 | 1,180 | 34 | 970 | 24 | 1,745 | 23 | 1,765 |
| 20 | Red Fleshed Tankard | 18 | 740 | 14 | 50 | 18 | 1,125 | 20 | 1,250 | 28 | 100 | 23 | 35 | 23 | 1,685 | 37 | 250 | 32 | 1,670 | 25 | 50 | 22 | 1,664 |

The crops from the two sowings of mangels at the experimental farms in 1899 have averaged per acre as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 28 | 85 |
| " " second sowing | 17 | 1,107 |
| Experimental Farm, Nappan, first sowing | 23 | 970 |
| " " second sowing | 24 | 1,855 |
| Experimental Farm, Brandon, one sowing only | 28 | 248 |
| Experimental Farm, Indian Head, first sowing | 26 | 1,525 |
| " " second sowing | 23 | 571 |
| Experimental Farm, Agassiz, first sowing | 40 | 1,181 |
| " " second sowing | 38 | 19 |

Average crop from all the plots at all the farms—first sowing, 29 tons 802 lbs.; second sowing, 25 tons 1,888 lbs.

The six varieties of mangels which have produced the heaviest crops at the several experimental farms during 1899 are the following. (Unless otherwise stated the yields given are all from the earliest sown plots.)

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post | 34 | 640 | 4. Selected Mamm. Long Red | 33 | 330 |
| 2. Mammoth Long Red | 33 | 1,980 | 5. Giant Yellow Globe | 32 | 350 |
| 3. Canadian Giant | 33 | 330 | 6. Yellow Intermediate | 31 | 370 |

An average crop of 33 tons per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate | 30 | 1,878 | 4. Lion Yellow Intermediate | 30 | 225 |
| 2. Gate Post | 30 | 555 | 5. Ward's Large Oval Shaped | 30 | 225 |
| 3. Yellow Intermediate | 30 | 225 | 6. Norbiton Giant | 29 | 1,400 |

An average crop of 30 tons 418 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Norbiton Giant | 35 | 620 | 4. Lion Yellow Intermediate | 34 | 640 |
| 2. Yellow Intermediate | 35 | 620 | 5. Giant Yellow Intermediate | 33 | 1,650 |
| 3. Mammoth Long Red | 34 | 1,630 | 6. Ward's Large Oval Shaped | 33 | 1,320 |

An average crop of 34 tons 1,080 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post (2nd sowing) | 38 | 1,715 | 4. Norbiton Giant (2nd sowing) | 31 | 535 |
| 2. Yellow Intermediate | 35 | 1,940 | 5. Yellow Fleshed Tankard | 30 | 885 |
| 3. Champion Yellow Globe | 32 | 1,340 | 6. Ward's Large Oval Shaped | 30 | 720 |

An average crop of 33 tons 532 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 66 | 1,750 | 4. Lion Yellow Intermediate | 51 | 300 |
| 2. Ward's Large Oval Shaped | 53 | 1,185 | 5. Giant Yellow Intermediate | 49 | 1,165 |
| 3. Giant Yellow Half Long | 51 | 1,125 | 6. Mamm. Long Red | 48 | 1,925 |

An average crop of 53 tons 1,241 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops in 1899 taking the average of the results obtained on all the experimental farms are

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 39 | 1,781 | 4. Giant Yellow Half Long | 32 | 1,406 |
| 2. Ward's Large Oval Shaped | 35 | 145 | 5. Gate Post (2nd sowing) | 32 | 1,272 |
| 3. Giant Yellow Intermediate | 33 | 1,386 | 7. Lion Yellow Intermediate | 32 | 614 |

An average crop of 34 tons 767 lbs. per acre.

The early sown plots of mangels have given larger crops than those later sown at all the experimental farms excepting at Nappan where the advantage has been with the second sowing to the extent of 1 ton 855 lbs. per acre. The average results from all the farms show a difference of 3 tons 904 lbs. per acre in favour of the early sowings.

## TRIAL PLOTS OF CARROTS.

Twenty varieties of carrots were under test during 1899 all sown in drills or on the flat in rows two feet apart. Two sowings were made in each case, the second sowing two weeks later than the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following: At Ottawa, October 13; Nappan, October 11; Brandon, October 13; Indian Head, October 4, and at Agassiz on October 24. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

# UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. Sown May 11. Per acre. Tons. Lbs. | Ottawa, Ont. Sown May 25. Per acre. Tons. Lbs. | Nappan, N.S. Sown May 23. Per acre. Tons. Lbs. | Nappan, N.S. Sown June 7. Per acre. Tons. Lbs. | Brandon, Man. Sown May 25. Per acre. Tons. Lbs. | Brandon, Man. Sown June 3. Per acre. Tons. Lbs. | Indian Head, N.W.T. Sown May 20. Per acre. Tons. Lbs. | Indian Head, N.W.T. Sown May 29. Per acre. Tons. Lbs. | Agassiz, B.C. Sown April 27. Per acre. Tons. Lbs. | Agassiz, B.C. Sown May 12. Per acre. Tons. Lbs. | Average of all Farms. First Sowing. Per acre. Tons. Lbs. | Average of all Farms. Second Sowing. Per acre. Tons. Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Iverson's Champion | 33 660 | 33 .. | 21 1,725 | 17 1,805 | 17 980 | 14 1,370 | 19 610 | 15 690 | 29 1,400 | 28 1,970 | 24 675 | 21 1,967 |
| 2 | Giant White Vosges | 33 330 | 24 1,500 | 21 1,725 | 18 795 | 17 1,640 | 15 30 | 17 155 | 12 420 | 33 1,650 | 33 550 | 24 1,500 | 20 1,459 |
| 3 | Improved Short White | 33 .. | 31 700 | 22 1,375 | 17 650 | 15 360 | 12 1,749 | 19 1,270 | 15 690 | 33 220 | 25 1,700 | 24 1,445 | 20 1,096 |
| 4 | Mamm. White Intermediate | 32 1,340 | 32 20 | 21 900 | 16 1,705 | 19 610 | 13 1,390 | 14 1,205 | 14 710 | 33 440 | 30 1,600 | 24 499 | 21 1,094 |
| 5 | New White Intermediate | 32 680 | 28 1,420 | 22 1,375 | 18 795 | 17 1,640 | 10 790 | 16 1,000 | 13 1,060 | 29 300 | 33 440 | 23 1,399 | 20 1,701 |
| 6 | Green Top White Orthe | 28 1,750 | 24 1,830 | 17 650 | 15 1,845 | 16 1,330 | 12 1,080 | 16 835 | 14 50 | 27 1,220 | 26 1,570 | 21 757 | 18 1,675 |
| 7 | Long Yellow Stump rooted | 28 1,420 | 27 450 | 16 1,000 | 13 1,555 | 16 1,660 | 13 730 | 14 1,535 | 10 1,450 | 22 990 | 18 190 | 19 1,721 | 16 1,275 |
| 8 | Ontario Champion | 28 1,090 | 22 880 | 17 1,475 | 13 1,225 | 19 280 | 14 710 | 16 1,495 | 14 1,370 | 28 1,200 | 31 1,800 | 22 308 | 19 797 |
| 9 | White Belgian | 28 760 | 24 510 | 13 400 | 10 295 | 12 1,740 | 10 130 | 14 380 | 12 420 | 29 1,840 | 28 540 | 19 1,424 | 16 1,979 |
| 10 | Half Long White | 27 1,770 | 22 550 | 25 1,025 | 17 1,805 | 18 300 | 10 1,780 | 18 300 | 17 1,970 | 34 1,520 | 32 1,340 | 24 1,983 | 20 689 |
| 11 | Guerande or Ox Heart | 26 1,955 | 25 1,150 | 12 1,575 | 18 300 | 14 1,700 | 12 90 | 13 1,060 | 11 1,100 | 25 160 | 22 1,870 | 18 1,290 | 18 102 |
| 12 | Early Gem | 25 820 | 20 920 | 12 1,575 | 16 1,000 | 13 1,060 | 11 770 | 15 525 | 10 130 | 22 1,650 | 22 660 | 17 1,926 | 16 296 |
| 13 | Half Long Chantenay | 25 820 | 20 590 | 11 1,000 | 13 400 | 13 70 | 10 1,120 | 11 605 | 8 500 | 22 770 | 22 550 | 16 1,453 | 14 1,832 |
| 14 | Yellow Intermediate | 24 1,170 | 23 1,190 | 11 275 | 10 955 | 15 30 | 11 1,100 | 16 1,990 | 14 710 | 25 1,700 | 19 1,940 | 18 1,433 | 15 1,979 |
| 15 | White Vosges Large Short | 22 385 | 20 1,250 | 11 275 | 12 1,245 | 12 1,740 | 9 480 | 15 1,350 | 12 255 | 22 550 | 22 1,100 | 16 1,660 | 15 866 |
| 16 | Scarlet Intermediate | 19 940 | 15 360 | 10 625 | 9 1,305 | 11 770 | 9 1,140 | 9 1,305 | 7 1,510 | 16 1,440 | 18 1,400 | 13 1,016 | 12 343 |
| 17 | Carter's Orange Giant | 18 1,950 | 18 300 | 11 1,925 | 11 605 | 13 400 | 8 1,490 | 11 110 | 9 480 | 17 320 | 13 950 | 14 941 | 12 365 |
| 18 | Long Orange or Surrey | 17 1,310 | 16 1,990 | 11 1,000 | 10 1,945 | 12 750 | 10 1,450 | 9 1,635 | 9 1,800 | 25 160 | 17 650 | 15 571 | 13 367 |
| 19 | Scarlet Nantes | 16 1,000 | 12 1,245 | 10 1,450 | 9 1,305 | 8 1,820 | 6 1,860 | 8 500 | 3 1,920 | 11 110 | 10 1,340 | 11 176 | 8 1,534 |
| 20 | Long Scarlet Altringham | 14 380 | 13 70 | 12 1,575 | 10 295 | 6 1,860 | 5 1,220 | 10 460 | 8 500 | 18 1,400 | 16 1,220 | 12 1,135 | 10 1,461 |

The crops from the two sowings of carrots at the experimental farms in 1899 have averaged as follows:—

| | | |
|---|---|---|
| Central Experimental Farm, first sowing | 25 tons | 1,826 lbs. |
| " second sowing | 22 " | 1,746 " |
| Experimental Farm, Nappan, first sowing | 15 " | 1,746 " |
| " " second sowing | 14 " | 291 " |
| " Brandon, first sowing | 14 " | 1,337 " |
| " " second sowing | 11 " | 423 " |
| Experimental Farm, Indian Head, first sowing | 14 tons | 916 lbs. |
| " " second sowing | 11 " | 1,586 " |
| " Agassiz, first sowing | 25 " | 952 " |
| " " second sowing | 23 " | 1,669 " |

Average crop from all the plots at all the farms, first sowing, 19 tons 555 lbs., second sowing, 16 tons 1,543 lbs.

# UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | Indian Head, N.W.T. | | | | Agassiz, B.C. | | | | Average of all Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 11. | | Sown May 25. | | Sown May 20. | | Sown June 5. | | Sown May 20. | | Sown May 23. | | Sown May 30. | | Sown April 24. | | Sown May 9. | | First Sowing. | | Second Sowing. | |
| | | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. | Per acre. Tons. | lbs. |
| 1 | Gate Post | 34 | 640 | 22 | 880 | 28 | 1,750 | 30 | 555 | 18 | 630 | 29 | 1,235 | 38 | 1,715 | 41 | 170 | 39 | 540 | 30 | 885 | 32 | 1,272 |
| 2 | Mamm. Long Red | 33 | 1,980 | 21 | 405 | 22 | 1,375 | 21 | 1,725 | 34 | 1,630 | 24 | 1,665 | 21 | 75 | 42 | 480 | 48 | 1,925 | 31 | 1,418 | 28 | 542 |
| 3 | Canadian Giant | 33 | 330 | 21 | 1,890 | 20 | 1,250 | 21 | 900 | 12 | 750 | 24 | 1,830 | 18 | 465 | 34 | 640 | 33 | 1,980 | 25 | 160 | 23 | 1,809 |
| 4 | Prize Mamm. Long Red | 33 | 330 | 20 | 260 | 21 | 75 | 22 | 550 | 33 | .... | 21 | 405 | 20 | 920 | 48 | 525 | 26 | 270 | 31 | 667 | 24 | 1,560 |
| 5 | Selected Mamm. Long Red | 33 | 330 | 18 | 300 | 21 | 1,725 | 28 | 925 | 32 | 1,010 | 29 | 80 | 20 | 1,085 | 41 | 1,160 | 33 | 1,650 | 31 | 1,261 | 25 | 490 |
| 6 | Giant Yellow Globe | 32 | 350 | 21 | 75 | 17 | 650 | 20 | 425 | 27 | 450 | 28 | 1,420 | 30 | 390 | 37 | 1,240 | 36 | 1,920 | 28 | 1,222 | 27 | 202 |
| 7 | Yellow Intermediate | 31 | 370 | 18 | 1,620 | 30 | 225 | 29 | 905 | 35 | 620 | 35 | 1,940 | 22 | 1,375 | 66 | 1,750 | 55 | 1,870 | 39 | 1,781 | 31 | 1,442 |
| 8 | Ward's Large Oval Shaped | 30 | 1,050 | 14 | 1,205 | 27 | 450 | 30 | 225 | 33 | 1,320 | 30 | 720 | 25 | 160 | 53 | 1,185 | 51 | 1,620 | 35 | 145 | 30 | 802 |
| 9 | Lion Yellow Intermediate | 30 | 60 | 19 | 1,765 | 20 | 1,250 | 30 | 225 | 34 | 640 | 25 | 820 | 26 | 1,295 | 51 | 300 | 47 | 1,855 | 32 | 614 | 31 | 285 |
| 10 | Giant Yellow Intermediate | 29 | 1,565 | 20 | 260 | 30 | 1,878 | 26 | 1,625 | 33 | 1,650 | 24 | 675 | 24 | 1,170 | 49 | 1,165 | 39 | 540 | 33 | 1,386 | 27 | 1,398 |
| 11 | Giant Yellow Half Long | 29 | 1,400 | 19 | 610 | 26 | 1,250 | 27 | 1,605 | 31 | 1,690 | 29 | 1,565 | 22 | 55 | 51 | 1,125 | 50 | 1,310 | 32 | 1,406 | 29 | 1,895 |
| 12 | Champion Yellow Globe | 27 | 1,450 | 16 | 1,660 | 18 | 1,125 | 17 | 1,475 | 8 | 1,490 | 32 | 1,340 | 18 | 795 | 24 | 1,830 | 24 | 1,005 | 22 | 1,647 | 19 | 484 |
| 13 | Mamm. Yellow Intermediate | 25 | 1,315 | 16 | 1,010 | 27 | 1,275 | 26 | 1,625 | 33 | .. | 24 | 1,335 | 19 | 1,270 | 41 | 1,160 | 33 | 1,650 | 30 | 1,017 | 24 | 389 |
| 14 | Gate Post Yellow | 25 | 820 | 14 | 215 | 18 | 1,125 | 17 | 1,475 | 14 | 1,700 | 17 | 1,475 | 18 | 1,455 | 38 | 1,388 | 37 | 250 | 23 | 101 | 21 | 1,849 |
| 15 | Mamm. Oval Shaped | 25 | 160 | 13 | 1,940 | 25 | 325 | 29 | 1,400 | 33 | 660 | 25 | 1,795 | 18 | 135 | 29 | 410 | 24 | 675 | 27 | 1,470 | 21 | 1,037 |
| 16 | Warden Orange Globe | 23 | 230 | 11 | 1,265 | 25 | 1,975 | 25 | 1,025 | 25 | 1,810 | 21 | 1,230 | 23 | 365 | 29 | 1,400 | 27 | 285 | 25 | 529 | 21 | 1,735 |
| 17 | Norbiton Giant | 23 | 200 | 15 | 360 | 29 | 1,400 | 29 | 1,400 | 35 | 620 | 27 | 1,275 | 31 | 535 | 25 | 1,480 | 28 | 1,420 | 28 | 595 | 26 | 429 |
| 18 | Yellow Fleshed Tankard | 20 | 1,250 | 15 | 695 | 16 | 1,825 | 20 | 95 | 31 | 700 | 30 | 885 | 18 | 795 | 41 | 500 | 42 | 975 | 28 | 232 | 24 | 140 |
| 19 | Golden Fleshed Tankard | 19 | 1,600 | 15 | 1,680 | 26 | 1,365 | 21 | 1,725 | 24 | 1,500 | 27 | 780 | 23 | 1,685 | 25 | 1,480 | 34 | 970 | 24 | 1,745 | 23 | 1,765 |
| 20 | Red Fleshed Tankard | 18 | 740 | 14 | 50 | 18 | 1,125 | 20 | 1,250 | 28 | 100 | 23 | 35 | 23 | 1,685 | 37 | 250 | 32 | 1,670 | 25 | 50 | 22 | 1,664 |

The crops from the two sowings of mangels at the experimental farms in 1899 have averaged per acre as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 28 | 85 |
| " " second sowing | 17 | 1,107 |
| Experimental Farm, Nappan, first sowing | 23 | 970 |
| " " second sowing | 24 | 1,855 |
| Experimental Farm, Brandon, one sowing only | 28 | 248 |
| Experimental Farm, Indian Head, first sowing | 26 | 1,525 |
| " " second sowing | 23 | 571 |
| Experimental Farm, Agassiz, first sowing | 40 | 1,181 |
| " " second sowing | 38 | 19 |

Average crop from all the plots at all the farms—first sowing, 29 tons 802 lbs.; second sowing, 25 tons 1,888 lbs.

4

## UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 11. | Sown May 25. | Sown May 23. | Sown June 7. | Sown May 25. | Sown June 3. | Sown May 20. | Sown May 29. | Sown April 27. | Sown May 12. | First Sowing. | Second Sowing. |
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Iverson's Champion | 33 660 | 33 . | 21 1,725 | 17 1,805 | 17 980 | 14 1,370 | 19 610 | 15 690 | 29 1,400 | 28 1,970 | 24 675 | 21 1,967 |
| 2 | Giant White Vosges | 33 330 | 24 1,500 | 21 1,725 | 18 795 | 17 1,640 | 15 30 | 17 155 | 12 420 | 33 1,650 | 33 550 | 24 1,500 | 20 1,459 |
| 3 | Improved Short White | 33 .. | 31 700 | 22 1,375 | 17 650 | 15 360 | 12 1,740 | 19 1,270 | 15 690 | 33 220 | 25 1,700 | 24 1,415 | 20 1,096 |
| 4 | Mamm. White Intermediate | 32 1,340 | 32 20 | 21 900 | 16 1,705 | 19 610 | 13 1,390 | 14 1,205 | 14 710 | 33 440 | 30 1,600 | 24 499 | 21 1,094 |
| 5 | New White Intermediate | 32 680 | 28 1,420 | 22 1,375 | 18 795 | 17 1,640 | 10 790 | 16 1,000 | 13 1,060 | 29 300 | 33 440 | 23 1,399 | 20 1,701 |
| 6 | Green Top White Orthe | 28 1,750 | 24 1,830 | 17 650 | 15 1,845 | 16 1,330 | 12 1,080 | 16 835 | 14 50 | 27 1,220 | 26 1,570 | 21 757 | 18 1,675 |
| 7 | Long Yellow Stump rooted | 28 1,420 | 27 450 | 16 1,000 | 13 1,555 | 16 1,660 | 13 730 | 14 1,535 | 10 1,450 | 22 990 | 18 190 | 19 1,721 | 16 1,275 |
| 8 | Ontario Champion | 28 1,090 | 22 880 | 17 1,475 | 13 1,225 | 19 280 | 14 710 | 16 1,495 | 14 1,370 | 28 1,200 | 31 1,800 | 22 308 | 19 797 |
| 9 | White Belgian | 28 760 | 24 510 | 13 400 | 10 295 | 12 1,740 | 10 130 | 14 380 | 12 420 | 29 1,840 | 28 540 | 19 1,424 | 16 1,979 |
| 10 | Half Long White | 27 1,770 | 22 550 | 25 1,025 | 17 1,805 | 18 300 | 10 1,780 | 18 300 | 17 1,970 | 34 1,520 | 32 1,240 | 24 1,983 | 20 689 |
| 11 | Guerande or Ox Heart | 26 1,955 | 25 1,150 | 12 1,575 | 18 300 | 14 1,700 | 12 90 | 13 1,060 | 11 1,100 | 25 160 | 22 1,870 | 18 1,290 | 18 102 |
| 12 | Early Gem | 25 820 | 20 920 | 12 1,575 | 16 1,000 | 13 1,060 | 11 770 | 15 525 | 10 130 | 22 1,650 | 22 660 | 17 1,926 | 16 296 |
| 13 | Half Long Chantenay | 25 820 | 20 590 | 11 1,000 | 13 400 | 13 70 | 10 1,120 | 11 605 | 8 500 | 22 770 | 22 550 | 16 1,453 | 14 1,832 |
| 14 | Yellow Intermediate | 24 1,170 | 23 1,190 | 11 275 | 10 955 | 15 30 | 11 1,100 | 16 1,990 | 14 710 | 25 1,700 | 19 1,940 | 18 1,433 | 15 1,979 |
| 15 | White Vosges Large Short | 22 385 | 20 1,250 | 11 275 | 12 1,245 | 12 1,740 | 9 480 | 15 1,350 | 12 255 | 22 550 | 22 1,100 | 16 1,660 | 15 866 |
| 16 | Scarlet Intermediate | 19 940 | 15 360 | 10 625 | 9 1,305 | 11 770 | 9 1,140 | 9 1,305 | 7 1,510 | 16 1,440 | 18 1,400 | 13 1,016 | 12 343 |
| 17 | Carter's Orange Giant | 18 1,950 | 18 300 | 11 1,925 | 11 605 | 13 400 | 8 1,490 | 11 110 | 9 480 | 17 320 | 13 950 | 14 941 | 12 365 |
| 18 | Long Orange or Surrey | 17 1,310 | 16 1,990 | 11 1,000 | 10 1,945 | 12 750 | 10 1,450 | 9 1,635 | 9 1,800 | 25 160 | 17 650 | 15 571 | 13 367 |
| 19 | Scarlet Nantes | 16 1,000 | 12 1,245 | 10 1,450 | 9 1,305 | 8 1,820 | 6 1,860 | 8 500 | 3 1,920 | 11 110 | 10 1,340 | 11 176 | 8 1,534 |
| 20 | Long Scarlet Altringham | 14 380 | 13 70 | 12 1,575 | 10 295 | 6 1,860 | 5 1,220 | 10 460 | 8 500 | 18 1,400 | 16 1,220 | 12 1,135 | 10 1,461 |

The crops from the two sowings of carrots at the experimental farms in 1899 have averaged as follows :—

| | | |
|---|---|---|
| Central Experimental Farm, first sowing | 25 tons | 1,826 lbs. |
| " second sowing | 22 " | 1,746 " |
| Experimental Farm, Nappan, first sowing | 15 " | 1,746 " |
| " " second sowing | 14 " | 291 " |
| " Brandon, first sowing | 14 " | 1,337 " |
| " " second sowing | 11 " | 423 " |
| Experimental Farm, Indian Head, first sowing | 14 tons | 916 lbs. |
| " " second sowing | 11 " | 1,586 " |
| " Agassiz, first sowing | 25 " | 952 " |
| " " second sowing | 23 " | 1,669 " |

Average crop from all the plots at all the farms, first sowing, 19 tons 555 lbs., second sowing, 16 tons 1,543 lbs.

The six varieties of carrots which have produced the heaviest crops at the several experimental farms during 1899 are the following, (unless otherwise stated the yields given are all from the earliest sown plots).

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Iverson's Champion........ | 33 | 660 | 4. Mamm. White Intermediate. | 32 | 1,340 |
| 2. Giant White Vosges......... | 33 | 330 | 5. New White Intermediate.... | 32 | 680 |
| 3. Improved Short White...... | 33 | — | 6. Green Top White Orthe.... | 28 | 1,750 |

An average crop of 32 tons 46 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White........... | 25 | 1,025 | 4. Iverson's Champion ........ | 21 | 1,725 |
| 2. Improved Short White .... | 22 | 1,375 | 5. Giant White Vosges........ | 21 | 1,725 |
| 3. New White Intermediate.... | 22 | 1,375 | 6. Mamm. White Intermediate. | 21 | 900 |

An average crop of 22 tons 1,354 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate. | 19 | 610 | 4. Giant White Vosges........ | 17 | 1,640 |
| 2. Ontario Champion. ....... . | 19 | 280 | 5. New White Intermediate... | 17 | 1,640 |
| 3. Half Long White...... ..... | 18 | 300 | 6. Iverson's Champion........ | 17 | 980 |

An average crop of 18 tons 575 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs |
|---|---|---|---|---|---|
| 1. Improved Short White...... | 19 | 1,270 | 4. Giant White Vosges........ | 17 | 155 |
| 2. Iverson's Champion ........ | 19 | 610 | 5. Yellow Intermediate........ | 16 | 1,990 |
| 3. Half Long White...... ..... | 18 | 300 | 6. Ontario Champion......... | 16 | 1,495 |

An average crop of 17 tons 1,970 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White........... | 34 | 1,520 | 5. Improved Short White..... | 33 | 220 |
| 2. Giant White Vosges. . ..... | 33 | 1,650 | 6. Ontario Champion, 2nd sowing....................... | 31 | 1,800 |
| 3. Mamm. White Intermediate. | 33 | 440 | | | |
| 4. New White Intermediate, 2nd sowing......... .......... | 33 | 440 | | | |

An average crop of 33 tons 678 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops in 1899 taking the average of the results obtained on all the experimental farms are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White........... | 24 | 1,983 | 4. Iverson's Champion........ | 24 | 675 |
| 2. Giant White Vosges......... | 24 | 1,500 | 5. Mamm. White Intermediate | 24 | 499 |
| 3. Improved Short White..... | 24 | 1,445 | 5. New White Intermediate... | 23 | 1,399 |

An average crop of 24 tons 917 lbs. per acre.

The early sown plots of carrots have given larger crops than those later sown at all the experimental farms. The average results from all the farms show a difference in the crops of 1899 of 2 tons 1,012 lbs. per acre in favour of the early sowings.

## TRIAL PLOTS OF SUGAR BEETS.

Six varieties of sugar beets have been tested during 1899, sown in drills or on the flat in rows two feet apart. Two sowings were made in each case, the second about two weeks later than the first. The dates of sowing will be found in the accompanying table. The following are the dates on which the roots were pulled :—At Ottawa, October 13 ; Nappan, October 10 and 11 : Indian Head, October 4. and at Agassiz on October 24. The yield per acre in each instance has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF SUGAR BEETS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 11. | Sown May 25. | Sown May 23. | Sown June 7. | Sown May 20. | Sown June 3. | Sown May 25. | Sown June 2. | Sown April 25. | Sown May 9. | First Sowing. | Second Sowing. |
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Wanzleben | 28 1,585 | 18 1,950 | 19 1,600 | 21 75 | 34 1,630 | * | 15 1,845 | 14 710 | 25 160 | 24 1,500 | 24 1,764 | 19 1,559 |
| 2 | Improved Imperial | 27 450 | 18 1,950 | 18 1,125 | 17 155 | 26 1,130 | 20 920 | 12 1,740 | 13 1,060 | 28 210 | 25 1,370 | 22 1,331 | 19 291 |
| 3 | Vilmorin's Improved | 26 800 | 15 690 | 22 555 | 17 1,475 | 26 1,460 | 15 690 | 13 235 | 15 690 | 26 250 | 25 1,480 | 22 1,860 | 17 1,805 |
| 4 | Danish Improved | 21 1,230 | 16 1,990 | 17 1,475 | 18 1,125 | 34 970 | 20 590 | 22 550 | 20 920 | 29 960 | 29 310 | 25 237 | 21 187 |
| 5 | Danish Red Top | 19 1,270 | 19 1,270 | 26 800 | 25 325 | 30 1,710 | 27 1,770 | 13 1,225 | 12 420 | 33 110 | 28 1,860 | 21 1,423 | 22 1,529 |
| 6 | Red Top Sugar | 18 1,290 | 16 1,660 | 24 1,500 | 23 1,355 | 25 1,810 | 22 220 | 10 625 | 11 1,100 | 18 1,860 | 23 1,080 | 19 1,417 | 19 1,083 |

*This sowing at Brandon was omitted.

The crops from the two sowings of sugar beets at the experimental farms have averaged as follows:—

| | tons. | lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 23 | 1,437 |
| " " " second sowing | 17 | 1,585 |
| Experimental Farm, Nappan, first sowing | 21 | 1,175 |
| " " " second sowing | 20 | 1,085 |
| Experimental Farm, Brandon, first sowing | 29 | 285 |
| " " " second sowing | 21 | 438 |
| Experimental Farm, Indian Head, first sowing | 14 | 1,370 |
| " " " second sowing | 14 | 1,150 |
| Experimental Farm, Agassiz, first sowing | 26 | 1,591 |
| " " " second sowing | 26 | 600 |

Average crop from all the plots at all the farms: first sowing, 23 tons 371 lbs.; second sowing, 20 tons 171 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops at the several experimental farms in 1899 are the following. (Unless otherwise stated, the yields given are all from the earliest sown plots):—

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Wanzleben | 28 | 1,585 | 3. Vilmorin's Improved | 26 | 800 |
| 2. Improved Imperial | 27 | 450 | 4. Danish Improved | 21 | 1,230 |

An average crop of 26 tons 16 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top | 26 | 800 | 3. Vilmorin's Improved | 22 | 555 |
| 2. Red Top Sugar | 24 | 1,500 | 4. Wanzleben, 2nd sowing | 21 | 75 |

An average crop of 23 tons 1,232 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Wanzleben | 34 | 1,630 | 3. Danish Red Top | 30 | 1,710 |
| 2. Danish Improved | 34 | 970 | 4. Vilmorin's Improved | 26 | 1,460 |

An average crop of 31 tons 961 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved | 22 | 550 | 3. Vilmorin's Improved, 2nd sowing | 15 | 690 |
| 2. Wanzleben | 15 | 1,845 | 4. Danish Red Top | 13 | 1,225 |

An average crop of 16 tons 1,577 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top | 33 | 110 | 3. Improved Imperial | 28 | 210 |
| 2. Danish Improved | 29 | 960 | 4. Vilmorin's Improved | 26 | 250 |

An average crop of 29 tons 382 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops in 1899, taking the average of the results obtained at all the experimental farms, are the following:—

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs |
|---|---|---|---|---|---|
| 1. Danish Improved | 25 | 237 | 3. Danish Red Top | 24 | 1,423 |
| 2. Wanzleben | 24 | 1,764 | 4. Vilmorin's Improved | 22 | 1,860 |

An average crop of 24 tons 821 lbs. per acre.

The early sown plots of sugar beets have given larger crops than those later sown at all the experimental farms. The average results from all the farms show a difference in the crops of 1899 of 3 tons 200 lbs. per acre in favour of the early sowing.

## TRIAL PLOTS OF POTATOES.

One hundred and six varieties of potatoes have been under trial in uniform test plots during 1899. The potatoes for planting were cut into pieces with two or three eyes in each, and these were planted in rows $2\frac{1}{2}$ feet apart, the sets being placed a foot apart in the rows. The following were the dates of planting and digging:—At Ottawa, planted on May 22 and 23, dug October 5 to 7; Nappan, planted May 25, dug September 22 to 25; Brandon, planted, May 23, dug October 2; Indian Head, planted May 25, dug September 28; and at Agassiz, planted from May 13 to 22, dug September 28 to October 4. The yield per acre has been calculated in each case from the weight of tubers gathered from two rows, each 66 feet long.

### UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1899. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C | | Average of all Farms. | |
| | | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. |
| 1 | American Wonder. | 640 | 12 | 391 | 36 | * | | 453 | 45 | 228 | 48 | 428 | 35 |
| 2 | Holborn Abundance | 609 | 24 | 473 | .. | 319 | .. | 233 | 45 | 330 | .. | 393 | 10 |
| 3 | Everett ........... | 574 | 12 | 484 | .. | 275 | .. | 261 | 15 | 369 | 36 | 392 | 48 |
| 4 | Carman No. 1...... | 541 | 12 | 420 | 12 | 330 | .. | 346 | 30 | 243 | 38 | 376 | 18 |
| 5 | Maggie Murphy ... | 541 | 12 | 261 | 48 | 333 | 40 | 154 | .. | 363 | 44 | 330 | 53 |
| 6 | White Beauty .... | 534 | 36 | 250 | 48 | 289 | 40 | 321 | 45 | 372 | 30 | 353 | 52 |
| 7 | Hale's Champion .. | 532 | 24 | 473 | .. | 287 | 50 | 126 | 30 | 365 | 12 | 356 | 59 |
| 8 | Vanier.. ..... | 530 | 12 | 473 | .. | 333 | 40 | 302 | 30 | 291 | 52 | 386 | 15 |
| 9 | Seattle............ | 528 | .. | 402 | 36 | * | | 288 | 45 | 291 | 8 | 377 | 35 |
| 10 | New Queen........ | 521 | 24 | 288 | 12 | 275 | .. | 251 | 45 | 278 | 42 | 323 | 1 |
| 11 | Wonder of the World | 514 | 48 | 371 | 48 | 209 | .. | 242 | .. | 353 | 28 | 338 | 12 |
| 12 | Lizzie's Pride...... | 506 | .. | 411 | 24 | 330 | .. | 247 | 30 | 321 | 12 | 363 | 13 |
| 13 | Empire State...... | 500 | 30 | 448 | 48 | * | | 225 | 30 | 362 | 16 | 384 | 16 |
| 14 | Beauty of Hebron. | 500 | 24 | 286 | .. | 242 | .. | 330 | .. | 180 | 24 | 307 | 45 |
| 15 | Seedling No. 230... | 495 | .. | 550 | .. | 293 | 20 | 280 | 30 | 368 | 8 | 397 | 23 |
| 16 | Early Sunrise ..... | 492 | 48 | 396 | .. | 194 | 20 | 354 | 45 | 289 | 20 | 345 | 26 |
| 17 | State of Maine .... | 488 | 24 | 330 | .. | 320 | 50 | 269 | 30 | 282 | 20 | 338 | 13 |
| 18 | Early Rose........ | 484 | .. | 424 | 36 | 282 | 20 | 233 | 45 | 237 | 36 | 332 | 27 |
| 19 | Ideal.......... ... | 481 | 48 | 341 | .. | * | | 220 | .. | ... | .... | 347 | 36 |
| 20 | Lightning Express. | 479 | 36 | 360 | 48 | 293 | 20 | 198 | .. | 277 | 12 | 321 | 47 |
| 21 | Early White Prize. | 475 | 12 | 323 | 24 | 245 | 40 | 261 | 15 | 266 | 10 | 314 | 20 |
| 22 | Brown's Rot Proof. | 473 | .. | 327 | 48 | 293 | 20 | ... | ..... | 384 | 16 | 369 | 36 |
| 23 | Monroe County.... | 473 | .. | 259 | 36 | * | | 167 | 45 | 359 | 20 | 314 | 55 |
| 24 | Burnaby Seedling.. | 468 | 36 | 409 | 12 | 370 | 20 | 412 | 30 | 334 | 24 | 399 | .. |
| 25 | Polaris........ .... | 464 | 12 | 380 | 36 | * | | 250 | 15 | 397 | 16 | 373 | 5 |
| 26 | Chicago Market.... | 459 | 48 | 275 | .. | 293 | 20 | 228 | 30 | 286 | .. | 308 | 31 |
| 27 | Vick's Extra Early. | 457 | 36 | 347 | 36 | 190 | 40 | 275 | .. | 264 | .. | 306 | 52 |
| 28 | Earliest of All..... | 455 | 24 | 402 | 36 | 242 | .. | 250 | 15 | 356 | 14 | 341 | 18 |
| 29 | Seedling No. 7..... | 453 | 12 | 354 | 12 | 275 | .. | 137 | 30 | 225 | 52 | 289 | 9 |
| 30 | Good News........ | 453 | 12 | 402 | 36 | 311 | 40 | 228 | 15 | 319 | 44 | 343 | 5 |
| 31 | American Giant.... | 453 | 12 | 534 | 36 | 326 | 20 | 338 | 15 | 215 | 36 | 373 | 36 |
| 32 | Early Norther..... | 453 | 12 | 376 | 12 | * | | ......... | | 265 | 30 | 364 | 58 |
| 33 | Penn. Manor .... | 453 | 12 | 477 | 24 | 377 | 40 | 220 | .. | 288 | 50 | 363 | 25 |
| 34 | Columbus.. ....... | 451 | .. | 455 | 24 | * | | 324 | 30 | 205 | 20 | 359 | 4 |
| 35 | Ohio Junior ....... | 451 | .. | 319 | .. | 242 | .. | 151 | 15 | 375 | 28 | 307 | 45 |
| 36 | Thorburn ......... | 448 | 48 | 264 | .. | 253 | .. | 222 | 45 | 388 | 40 | 315 | 27 |
| 37 | Northern Spy ..... | 448 | 48 | 369 | 36 | 311 | 40 | 206 | 15 | 315 | 20 | 333 | 20 |
| 38 | Sir Walter Raleigh | 448 | 48 | 363 | .. | 282 | 20 | 200 | 45 | 190 | 40 | 297 | 7 |
| 39 | Great Divide..... | 442 | 12 | 492 | 48 | 300 | 40 | 187 | .. | 251 | 16 | 334 | 47 |
| 40 | Sharpe's Seedling.. | 441 | 6 | 248 | 36 | 201 | 40 | 288 | 45 | 403 | 20 | 316 | 41 |
| 41 | Satisfaction ....... | 440 | .. | 343 | 12 | 322 | 40 | 225 | 30 | 312 | 24 | 328 | 45 |
| 42 | Early Harvest..... | 437 | 48 | 451 | .. | 117 | 20 | 302 | 30 | 305 | 4 | 322 | 44 |
| 43 | Peerless Junior.... | 437 | 48 | 299 | 12 | 278 | 40 | 275 | .. | 231 | 18 | 304 | 24 |
| 44 | Orphans...... .... | 437 | 48 | 360 | 48 | * | | 206 | 15 | 271 | 20 | 319 | 3 |
| 45 | Honeoye Rose..... | 437 | 48 | 250 | 48 | ....... | . | 143 | .. | 295 | 32 | 281 | 45 |
| 46 | General Gordon ... | 433 | 24 | 453 | 12 | 344 | 40 | 233 | 45 | 308 | 44 | 354 | 45 |

Injured from flooding.

## UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1899. Ottawa, Ont. Per acre. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Per acre. Bush. | Nappan, N.S. Lbs. | Brandon, Man. Per acre. Bush. | Brandon, Man. Lbs. | Indian Head N.W.T. Per acre. Bush. | Indian Head N.W.T. Lbs. | Agassiz, B.C. Per acre. Bush. | Agassiz, B.C. Lbs. | Average of all Farms. Per acre. Bush. | Average of all Farms. Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | Burpee's Extra Early | 431 | 12 | 400 | 24 | 220 | .. | 305 | 15 | 331 | 28 | 337 | 40 |
| 48 | King of the Roses.. | 431 | 12 | 290 | 24 | 275 | .. | 258 | 30 | 265 | .. | 304 | 1 |
| 49 | Rochester Rose.... | 431 | 12 | 367 | 24 | * | | 343 | 45 | 285 | 20 | 356 | 55 |
| 50 | Clay Rose......... | 429 | . | 457 | 36 | 381 | 20 | 275 | . | 266 | 22 | 361 | 52 |
| 51 | Hopeful..... .... | 426 | 48 | 420 | 12 | 311 | 40 | 129 | 15 | 360 | 48 | 329 | 45 |
| 52 | Early Ohio........ | 426 | 48 | 380 | 36 | 190 | 40 | 206 | 15 | 266 | 44 | 294 | 13 |
| 53 | Dreer's Standard.. | 424 | 36 | 332 | 12 | 355 | 40 | 247 | 30 | 354 | 56 | 342 | 59 |
| 54 | Maule's Thoroughbred ........... | 422 | 24 | 211 | 12 | 377 | 40 | 173 | 15 | 344 | 20 | 305 | 46 |
| 55 | Seedling No. 230... | 418 | 12 | ...... ... | | * | | 280 | 30 | 368 | .. | 355 | 34 |
| 56 | Pride of the Table.. | 418 | .. | 184 | 48 | .... | .... | 261 | 15 | 265 | .. | 282 | 16 |
| 57 | Green Mountain... | 418 | .. | 380 | 36 | 330 | . | 200 | 45 | 322 | 40 | 330 | 24 |
| 58 | Dakota Red...... | 415 | 48 | 336 | 36 | 315 | 20 | 214 | 30 | 371 | 48 | 330 | 48 |
| 59 | Uncle Sam........ | 411 | 24 | 325 | 36 | 260 | 20 | 302 | 30 | 349 | 4 | 329 | 47 |
| 60 | Delaware .... .... | 411 | 24 | 325 | 36 | 403 | 20 | 192 | 30 | 212 | 40 | 309 | 6 |
| 61 | London...... .. .. | 409 | 12 | 334 | 24 | 242 | .. | 206 | 15 | 350 | 32 | 308 | 29 |
| 62 | Stourbridge Glory. | 409 | 12 | 334 | 24 | 183 | 20 | 250 | 15 | 346 | 8 | 304 | 40 |
| 63 | Rural Blush........ | 409 | 12 | 380 | 36 | 330 | .. | 247 | 30 | 310 | 56 | 335 | 39 |
| 64 | Prize Taker.. ..... | 407 | .. | 264 | .. | 205 | 20 | 316 | 15 | 234 | 40 | 285 | 27 |
| 65 | I. X. L.. ........ | 404 | 48 | 409 | 12 | 293 | 20 | 280 | 30 | 244 | 12 | 326 | 24 |
| 66 | Reeves' Rose...... | 404 | 48 | 433 | 24 | 322 | 40 | 269 | 30 | 215 | 36 | 329 | 12 |
| 67 | Freeman.......... | 400 | 24 | 367 | 24 | 333 | 40 | 219 | .. | 298 | 28 | 323 | 47 |
| 68 | New Variety No. 1. | 396 | .. | 418 | .. | 264 | .. | 203 | 30 | 387 | 12 | 331 | 44 |
| 69 | Troy Seedling...... | 396 | .. | 407 | .. | 388 | 40 | 233 | 45 | 327 | 6 | 350 | 30 |
| 70 | Crown Jewel ..... | 393 | 48 | 321 | 12 | 256 | 40 | 302 | 30 | 341 | 44 | 323 | 11 |
| 71 | Clarke's No. 1..... | 391 | 56 | 407 | .. | 319 | .. | 269 | 30 | 303 | 36 | 338 | 12 |
| 72 | Rose No. 9......... | 391 | 36 | 336 | 36 | 187 | .. | 275 | . | 371 | 4 | 312 | 15 |
| 73 | Flemish Beauty.... | 391 | 36 | 462 | .. | 330 | .. | 294 | 15 | 250 | 48 | 345 | 45 |
| 74 | Pearce's Extra Early | 389 | 24 | 283 | 48 | * | | 247 | 30 | 176 | .. | 274 | 11 |
| 75 | Money Maker...... | 389 | 24 | 308 | .. | 293 | 20 | 192 | 30 | 283 | 48 | 293 | 24 |
| 76 | Late Puritan.. .. . | 389 | 24 | 321 | 12 | 319 | .. | 288 | 45 | 294 | 4 | 322 | 29 |
| 77 | Rural No. 2.... ... | 387 | 12 | 272 | 48 | 234 | 40 | 206 | 15 | 231 | 40 | 266 | 31 |
| 78 | Bovee............ | 385 | .. | 534 | 36 | 256 | 40 | 390 | 30 | 343 | 12 | 382 | . |
| 79 | Early Gem........ | 382 | 48 | 387 | 12 | 311 | 40 | 217 | 15 | 181 | 52 | 296 | 9 |
| 80 | Irish Cobbler...... | 382 | 48 | 501 | 36 | 201 | 40 | 211 | 45 | 233 | 56 | 306 | 21 |
| 81 | Carman No. 3...... | 380 | 36 | 220 | .. | 311 | 40 | 302 | 30 | 222 | 56 | 287 | 32 |
| 82 | Pearce's Prize Win'r. | 377 | 18 | 345 | 24 | 297 | .. | 302 | 30 | 177 | 28 | 299 | 56 |
| 83 | Early Puritan...... | 369 | 36 | 312 | 24 | 330 | .. | 244 | 45 | 387 | 12 | 328 | 47 |
| 84 | Daisy..... ...... | 365 | 12 | 259 | 36 | 132 | .. | 244 | 45 | 283 | .. | 256 | 54 |
| 85 | McKenzie ......... | 358 | 36 | 453 | 12 | 330 | . | 203 | 30 | 297 | 44 | 328 | 36 |
| 86 | Cambridge Russet.. | 358 | 36 | 316 | 48 | 183 | 20 | 187 | .. | 269 | 30 | 263 | 3 |
| 87 | World's Fair...... | 343 | 12 | 325 | 36 | * | | 247 | 30 | 269 | 52 | 296 | 33 |
| 88 | Irish Daisy ...... | 334 | 24 | 429 | .. | 388 | 40 | 236 | 30 | 428 | 16 | 363 | 22 |
| 89 | Early Six Weeks... | 327 | 48 | 433 | 24 | 297 | .. | 247 | 30 | 212 | 40 | 303 | 41 |
| 90 | Charles Downing... | 327 | 48 | 281 | 36 | 275 | .. | 123 | 45 | 462 | .. | 293 | 62 |
| 91 | Harbinger. ...... | 319 | . | 365 | 12 | 264 | .. | 195 | 15 | 281 | 30 | 284 | 59 |
| 92 | Reading Giant..... | 316 | 48 | 424 | 36 | 245 | 40 | 206 | 15 | 356 | 14 | 309 | 55 |
| 93 | Lee's Favourite.... | 316 | 48 | 349 | 48 | 282 | 20 | 228 | 15 | 363 | .. | 308 | 2 |
| 94 | Country Gentleman. | 314 | 36 | 565 | 24 | 165 | .. | ... | .. | 294 | 28 | 334 | 52 |
| 95 | Bill Nye..... .... | 310 | 12 | 385 | .. | 333 | 40 | 371 | 15 | 337 | 20 | 347 | 29 |
| 96 | Table King........ | 292 | 36 | 294 | 48 | 121 | .. | 206 | 15 | 218 | 32 | 226 | 38 |
| 97 | Queen of the Valley. | 290 | 24 | 253 | .. | 275 | .. | 280 | 30 | 284 | 30 | 276 | 41 |
| 98 | Quaker City.... .. | 283 | 48 | 413 | 36 | 311 | 40 | 272 | 15 | 242 | .. | 304 | 40 |
| 99 | Algoma No. 1 ... | 283 | 48 | 402 | 36 | * | | 170 | 30 | 249 | 20 | 276 | 34 |
| 100 | Victor Rose... .... | 259 | 36 | 374 | .. | 260 | 20 | 302 | 30 | 277 | 56 | 294 | 52 |
| 101 | Fillbasket.. ....... | 246 | 24 | 211 | 12 | * | | 192 | 30 | 179 | 18 | 207 | 21 |
| 102 | Pride of the Market. | 235 | 24 | 506 | .. | 275 | .. | 302 | 30 | 381 | 20 | 340 | 3 |
| 103 | Early Market..... | 224 | 24 | 235 | 34 | 198 | .. | 167 | 45 | 280 | .. | 221 | 9 |
| 104 | Brownell's Winner. | 220 | .. | 325 | 36 | 330 | .. | 352 | .. | 266 | 10 | 298 | 45 |
| 105 | Seedling No. 214... | 209 | . | 314 | 36 | 128 | 20 | 220 | .. | 265 | 40 | 227 | 31 |
| 106 | Houlton Rose...... | 204 | 36 | 323 | 24 | * | | 244 | 45 | 296 | 16 | 267 | 15 |

* Injured from flooding.

The twelve varieties of potatoes which have produced the largest crops at the several experimental farms are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Wonder.. | 640 | 12 | 7. Hale's Champion | 532 | 24 |
| 2. Holborn Abundance | 609 | 24 | 8. Vanier | 530 | 12 |
| 3. Everett | 574 | 12 | 9. Seattle | 528 | .. |
| 4. Carman No. 1.. | 541 | 12 | 10. New Queen | 521 | 24 |
| 5. Maggie Murphy | 541 | 12 | 11. Wonder of the World | 514 | 48 |
| 6. White Beauty | 534 | 36 | 12. Lizzie's Pride | 506 | .. |

An average crop of 547 bushels 47 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling No. 230 | 550 | .. | 7. American Beauty | 492 | 48 |
| 2. American Giant | 534 | 36 | 8. Everett | 484 | .. |
| 3. Bovee | 534 | 36 | 9. Holborn Abundance | 473 | .. |
| 4. Pride of the Market | 506 | .. | 10. Hale's Champion | 473 | .. |
| 5. Irish Cobbler | 501 | 36 | 11. Vanier | 473 | .. |
| 6. Great Divide | 492 | 48 | 12. Flemish Beauty | 462 | .. |

An average crop of 498 bushels 7 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Delaware | 403 | 20 | 7. Dreer's Standard | 355 | 40 |
| 2. Irish Daisy | 388 | 40 | 8. General Gordon | 344 | 40 |
| 3. Troy Seedling | 388 | 40 | 9. Vanier | 333 | 40 |
| 4. Clay Rose | 387 | 20 | 10. Maggie Murphy | 333 | 40 |
| 5. Maule's Thoroughbred | 377 | 40 | 11. Freeman | 333 | 40 |
| 6. Burnaby Seedling | 370 | 20 | 12. Bill Nye | 333 | 40 |

An average crop of 362 bushels 35 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Wonder | 453 | 45 | 7. Carman No. 1 | 346 | 30 |
| 2. Burnaby Seedling | 412 | 30 | 8. Rochester Rose | 343 | 45 |
| 3. Bovee | 390 | 30 | 9. American Giant | 338 | 15 |
| 4. Bill Nye | 371 | 15 | 10. Beauty of Hebron | 330 | .. |
| 5. Early Sunrise | 354 | 45 | 11. Columbus | 324 | 30 |
| 6. Brownell's Winner | 352 | .. | 12. White Beauty | 321 | 45 |

An average crop of 361 bushels 37 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Charles Downing | 462 | .. | 7. New Variety No. 1 | 387 | 12 |
| 2. Irish Daisy | 428 | 16 | 8. Brown's Rot Proof | 384 | 16 |
| 3. Sharpe's Seedling | 403 | 20 | 9. Pride of the Market | 381 | 20 |
| 4. Polaris | 397 | 16 | 10. Ohio Junior | 375 | 28 |
| 5. Thorburn | 388 | 40 | 11. White Beauty | 372 | 30 |
| 6. Early Puritan | 387 | 12 | 12. Dakota Red | 371 | 48 |

An average crop of 394 bushels 56 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops in 1899, taking the average of the results obtained at all the experimental farms, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Wonder | 428 | 35 | 7. Empire State | 384 | 16 |
| 2. Burnaby Seedling | 399 | .. | 8. Bovee | 382 | .. |
| 3. Seedling No. 230 | 397 | 23 | 9. Seattle | 377 | 35 |
| 4. Holborn Abundance | 393 | 10 | 10. Carman No. 1 | 376 | 18 |
| 5. Everett | 392 | 48 | 11. American Giant | 373 | 36 |
| 6. Vanier | 386 | 15 | 12. Polaris | 373 | 5 |

An average crop of 386 bushels 40 lbs. per acre.

The average crop of all the varieties of potatoes tested at each of the experimental farms was as follows :—At Ottawa, 414 bushels 33 lbs. per acre ; Nappan, 363 bushels 22 lbs.: Brandon, 279 bushels 48 lbs.; Indian Head, 250 bushels 55 lbs.; and at Agassiz, 298 bushels 5 lbs. The average return given by the whole of the varieties at all the farms was 321 bushels 20 lbs. per acre.

# AVERAGE OF CROPS FOR THE PAST FOUR AND FIVE YEARS.

The results of experiments with varieties of grain to ascertain their relative productiveness become much more reliable and conclusive when the average experience of a series of years can be given. In this way slight variations arising from inequality of soil are to a large extent equalized, and the conclusions reached become a much more valuable guide to the farmer in his selection of seed. The longer the experiments are continued the more accurate are the indications given. The experiences here recorded with most of the more important cereals now cover a period of five years.

Fig. 2.—Experimental plots of Oats at Ottawa, Ont.

## FIVE YEARS' EXPERIENCE WITH VARIETIES OF OATS.

The twelve varieties of oats which have averaged the heaviest crops at the several experimental farms during the past five years are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner........................ | 69 | 23 | 7. Joanette .................... | 63 | 4 |
| 2. American Triumph........ | 67 | 7 | 8. American Beauty .......... | 63 | 2 |
| 3. Columbus..................... | 66 | 31 | 9. Holstein Prolific............ | 62 | 7 |
| 4. Golden Giant ............... | 65 | 28 | 10. Abundance................. | 61 | 31 |
| 5. Golden Beauty.............. | 65 | 1 | 11. Bavarian..................... | 61 | 15 |
| 6. Improved Ligowo ........... | 63 | 5 | 12. White Russian............. | 61 | 12 |

An average crop of 64 bushels 8 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Russian | 72 | 4 | 7. Early Blossom | 67 | 14 |
| 2. Wallis | 71 | 23 | 8. Lincoln | 67 | 6 |
| 3. Oderbruch | 70 | 16 | 9. American Beauty | 67 | 2 |
| 4. Banner | 69 | 6 | 10. Pense | 67 | 2 |
| 5. Abyssinia | 68 | .. | 11. Cream Egyptian | 66 | 20 |
| 6. Columbus | 67 | 30 | 12. Wide Awake | 65 | 30 |

An average crop of 68 bushels 13 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Beauty | 99 | 9 | 7. White Schonen | 83 | 4 |
| 2. Banner | 94 | 6 | 8. Golden Beauty | 82 | 26 |
| 3. Bavarian | 93 | 25 | 9. American Triumph | 81 | 11 |
| 4. Early Golden Prolific | 88 | 22 | 10. Abundance | 78 | 4 |
| 5. Golden Giant | 85 | 25 | 11. California Prolific Black | 77 | 30 |
| 6. Holstein Prolific | 83 | 26 | 12. Columbus | 77 | .. |

An average crop of 85 bushels 16 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Columbus | 88 | 20 | 7. Bavarian | 81 | 22 |
| 2. Holstein Prolific | 87 | 8 | 8. White Schonen | 81 | 17 |
| 3. American Beauty | 86 | 31 | 9. Early Golden Prolific | 81 | 16 |
| 4. Abundance | 85 | 4 | 10. Early Archangel | 80 | 32 |
| 5. Golden Beauty | 83 | 24 | 11. American Triumph | 80 | 30 |
| 6. Wide Awake | 82 | .. | 12. Banner | 80 | 27 |

An average crop of 83 bushels 13 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Giant | 70 | 28 | 7. American Beauty | 58 | 9 |
| 2. Banner | 65 | 21 | 8. Prolific Black Tartarian | 58 | 8 |
| 3. Lincoln | 61 | 7 | 9. Columbus | 58 | .. |
| 4. Bavarian | 61 | 6 | 10. Early Maine | 57 | 24 |
| 5. Early Gothland | 60 | 32 | 11. Oderbruch | 56 | 30 |
| 6. Early Blossom | 60 | 10 | 12. Holstein Prolific | 56 | 26 |

An average crop of 62 bushels 2 lbs. per acre.

The twelve varieties of oats which have produced the largest average crops for the past five years on all the experimental farms, and hence may perhaps be regarded as worthy of being placed at the head of the list for general cultivation, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 75 | 30 | 7. Holstein Prolific | 69 | 23 |
| 2. American Beauty | 74 | 31 | 8. Early Golden Prolific | 69 | 4 |
| 3. Columbus | 71 | 23 | 9. American Triumph | 67 | 24 |
| 4. Golden Giant | 71 | 12 | 10. Abundance | 67 | 24 |
| 5. Bavarian | 71 | 9 | 11. White Schonen | 67 | 24 |
| 6. Golden Beauty | 70 | 2 | 12. Wallis | 67 | 23 |

An average crop of 70 bushels 13 lbs. per acre.

# FIVE YEARS' EXPERIENCE WITH VARIETIES OF BARLEY.

## TWO-ROWED BARLEY.

The six varieties of two-rowed barley which have averaged the heaviest crops at the several experimental farms during the past five years are the following:—

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Sidney | 41 | 40 | 4. Bolton | 39 | 44 |
| 2. Danish Chevalier | 41 | 40 | 5. Victor | 39 | 34 |
| 3. Canadian Thorpe | 41 | 28 | 6. Nepean | 39 | 29 |

An average crop of 40 bushels 36 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Nepean | 40 | 25 | 4. Beaver | 38 | 20 |
| 2. Newton | 39 | .. | 5. Danish Chevalier | 38 | 12 |
| 3. French Chevalier | 38 | 40 | 6. Canadian Thorpe | 36 | 32 |

An average crop of 38 bushels 29 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 51 | 4 | 4. Newton | 47 | 12 |
| 2. Sidney | 49 | 30 | 5. Bolton | 47 | 4 |
| 3. Nepean | 47 | 24 | 6. Victor | 45 | 10 |

An average crop of 47 bushels 46 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 60 | 12 | 4. Prize Prolific | 54 | 14 |
| 2. Danish Chevalier | 58 | 24 | 5. Beaver | 52 | 36 |
| 3. Canadian Thorpe | 55 | 21 | 6. Sidney | 52 | 32 |

An average crop of 55 bushels 31 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Thorpe | 37 | 8 | 4. Kinver Chevalier | 35 | 18 |
| 2. French Chevalier | 36 | 12 | 5. Beaver | 34 | 22 |
| 3. Danish Chevalier | 35 | 28 | 6. Newton | 33 | .. |

An average crop of 35 bushels 14 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest crops for the past five years, taking the average of the results obtained on all the experimental farms, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 44 | 40 | 4. Canadian Thorpe | 42 | 26 |
| 2. Danish Chevalier | 42 | 41 | 5. Sidney | 42 | 16 |
| 3. Beaver | 42 | 39 | 6. Newton | 41 | 23 |

An average crop of 42 bushels 39 lbs. per acre.

### SIX-ROWED BARLEY.

The six varieties of six-rowed barley which have averaged the heaviest crops at the several experimental farms for the past five years are the following:

#### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 55 | 19 | 4. Pioneer | 51 | 30 |
| 2. Mensury | 53 | 26 | 5. Trooper | 48 | 25 |
| 3. Royal | 52 | 20 | 6. Stella | 48 | 3 |

An average crop of 51 bushels 28 lbs. per acre.

#### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 50 | 16 | 4. Trooper | 42 | 4 |
| 2. Oderbruch | 43 | .. | 5. Surprise | 42 | .. |
| 3. Vanguard | 42 | 24 | 6. Odessa | 41 | 28 |

An average crop of 43 bushels 28 lbs. per acre.

#### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1 Trooper | 57 | 9 | 4. Nugent | 53 | 30 |
| 2. Common | 56 | 4 | 5. Summit | 52 | 26 |
| 3. Mensury | 55 | 8 | 6. Surprise | 51 | 46 |

An average crop of 54 bushels 20 lbs. per acre.

#### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rennie's Improved | 62 | 10 | 4. Trooper | 58 | 16 |
| 2. Odessa | 59 | 44 | 5. Common | 57 | 35 |
| 3. Mensury | 58 | 20 | 6. Baxter | 57 | 30 |

An average crop of 59 bushels 2 lbs. per acre.

#### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Oderbruch | 35 | 3 | 4. Odessa | 32 | 36 |
| 2. Mensury | 34 | 4 | 5. Common | 32 | 6 |
| 3. Royal | 32 | 44 | 6. Trooper | 31 | 19 |

An average crop of 33 bushels 2 lbs. per acre.

The six varieties of six-rowed barley which have produced the largest crops for the past five years, taking the average of the results obtained on all the experimental farms are:

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 50 | 15 | 4. Oderbruch | 45 | 38 |
| 2. Trooper | 47 | 24 | 5. Common | 45 | 35 |
| 3. Odessa | 47 | 24 | 6. Royal | 45 | 34 |

An average crop of 47 bushels 4 lbs. per acre.

## FIVE YEARS' EXPERIENCE WITH VARIETIES OF SPRING WHEAT.

The twelve varieties of spring wheat which have averaged the heaviest crops at the several experimental farms during the past five years are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 27 | 24 | 7. Pringle's Champlain | 23 | 40 |
| 2. Wellman's Fife | 25 | 23 | 8. Stanley | 23 | 16 |
| 3. Colorado | 24 | 51 | 9. Huron | 22 | 38 |
| 4. Rio Grande | 24 | 42 | 10. Emporium | 22 | 8 |
| 5. Monarch | 24 | 7 | 11. Rideau | 22 | 5 |
| 6. Goose | 23 | 57 | 12. Percy | 21 | 55 |

An average crop of 23 bushels 51 lbs. per acre

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wellman's Fife | 35 | 12 | 7. Stanley | 31 | 24 |
| 2. Monarch | 34 | 40 | 8. White Russian | 31 | 16 |
| 3. White Connell | 33 | .. | 9. Rio Grande | 31 | 12 |
| 4. Huron | 32 | 56 | 10. Advance | 30 | 44 |
| 5. Goose | 32 | 40 | 11. Red Fern | 30 | 28 |
| 6. Preston | 32 | 4 | 12. Blenheim | 30 | 16 |

An average crop of 32 bushels 9 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Goose | 40 | 34 | 7. Pringle's Champlain | 35 | 58 |
| 2. White Fife | 39 | 4 | 8. White Connell | 35 | 40 |
| 3. Crown | 37 | 30 | 9. Rio Grande | 35 | 30 |
| 4. Red Fife | 37 | 10 | 10. White Russian | 34 | 22 |
| 5. Monarch | 37 | 4 | 11. Wellman's Fife | 33 | 58 |
| 6. Preston | 36 | 37 | 12. Advance | 33 | 46 |

An average crop of 36 bushels 26 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Fife | 41 | 38 | 7. White Fife | 39 | 34 |
| 2. Wellman's Fife | 40 | 24 | 8. Beaudry | 39 | 30 |
| 3. Huron | 40 | 6 | 9. Percy | 39 | 22 |
| 4. Red Fern | 39 | 50 | 10. Crown | 38 | 46 |
| 5. Preston | 39 | 48 | 11. Alpha | 38 | 36 |
| 6. Emporium | 39 | 38 | 12. Monarch | 38 | 2 |

An average crop of 39 bushels 43 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs |
|---|---|---|---|---|---|
| 1. Preston | 27 | 26 | 7. Red Fife | 26 | 3 |
| 2. Monarch | 26 | 40 | 8. White Fife | 26 | 1 |
| 3. Herisson Bearded | 26 | 38 | 9. White Connell | 25 | 54 |
| 4. Rio Grande | 26 | 24 | 10. Colorado | 25 | 50 |
| 5. White Russian | 26 | 20 | 11. Huron | 25 | 30 |
| 6. Wellman's Fife | 26 | 4 | 12. Red Fern | 25 | 28 |

An average crop of 26 bushels 11 lbs. per acre.

The twelve varieties of spring wheat which have produced the largest crops for the past five years, taking the average of the results obtained on all the experimental farms, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 32 | 40 | 7. White Connell | 30 | 46 |
| 2. Wellman's Fife | 32 | 12 | 8. Red Fife | 30 | 42 |
| 3. Monarch | 32 | 6 | 9. Huron | 30 | 31 |
| 4. Goose | 31 | 14 | 10. White Russian | 30 | 28 |
| 5. White Fife | 31 | .. | 11. Pringle's Champlain | 30 | 1 |
| 6. Rio Grande | 30 | 53 | 12. Red Fern | 29 | 50 |

An average crop of 31 bushels 7 lbs. per acre.

## THREE AND FOUR YEARS' EXPERIENCE WITH VARIETIES OF PEASE.

The twelve varieties of pease which have averaged the heaviest crops at the several experimental farms for the past three or four years are the following. On account of the mixing of the crop by the wind storm at Ottawa in 1899, the average of three years only can be given for this farm. Those varieties on the other farms which have been tested only three years are so marked.

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur | 41 | 22 | 7. Canadian Beauty | 35 | 30 |
| 2. Macoun | 39 | 10 | 8. Bedford | 35 | 27 |
| 3. Kent | 37 | 23 | 9. Creeper | 35 | 22 |
| 4. Agnes | 36 | 26 | 10. Duke | 35 | 17 |
| 5. Mackay | 36 | 15 | 11. Crown | 35 | 15 |
| 6. Black-eyed Marrowfat | 36 | 12 | 12. Paragon | 34 | 47 |

An average crop of 36 bushels 32 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 41 | 25 | 7. Carleton | 30 | 46 |
| 2. Centennial | 35 | .. | 8. Prince | 29 | 40 |
| 3. Pride | 33 | 45 | 9. L'ge White Marrowfat, 3 yrs | 29 | 40 |
| 4. New Potter | 32 | 55 | 10. Canadian Beauty | 28 | 35 |
| 5. Black-eyed Marrowfat | 32 | 50 | 11. Prince Albert | 28 | 10 |
| 6. Duke | 30 | 46 | 12. Paragon | 28 | 6 |

An average crop of 32 bushels per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pride | 50 | 46 | 7. Kent | 45 | 25 |
| 2. Mummy | 48 | 36 | 8. Crown | 45 | 20 |
| 3. New Potter | 47 | 52 | 9. Trilby | 44 | 35 |
| 4. Carleton | 47 | 15 | 10. Black-eyed Marrowfat | 44 | 18 |
| 5. White Wonder, 3 yrs | 45 | 43 | 11. King, 3 yrs | 43 | 10 |
| 6. Mackay | 45 | 25 | 12. Golden Vine, 3 yrs | 43 | 5 |

An average crop of 45 bushels 55 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Trilby | 40 | 40 | 7. Prince Albert | 34 | 57 |
| 2. Carleton | 39 | 2 | 8. Centennial | 34 | 5 |
| 3. Paragon | 38 | 37 | 9. Perth, 3 yrs | 33 | 46 |
| 4. Crown | 38 | 30 | 10. Macoun | 33 | 45 |
| 5. Archer, 3 yrs | 35 | 36 | 11. Creeper | 33 | 40 |
| 6. Duke | 35 | 22 | 12. White Wonder, 3 yrs | 33 | 36 |

An average crop of 35 bushels 58 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King, 3 yrs | 38 | 40 | 7. Arthur | 30 | 35 |
| 2. Victoria, 3 yrs | 34 | 46 | 8. Prussian Blue, 3 yrs | 30 | 26 |
| 3. White Wonder, 3 yrs | 34 | 26 | 9. Archer, 3 yrs | 30 | 16 |
| 4. Bright, 3 yrs | 33 | 23 | 10. Perth, 3 yrs | 29 | 40 |
| 5. Vincent, 3 yrs | 31 | . | 11. Creeper | 29 | 40 |
| 6. Early Britain, 3 yrs | 30 | 36 | 12. Bedford | 29 | 25 |

An average crop of 31 bushels 54 lbs. per acre.

The twelve varieties of pease which have produced the largest crops for the past three or four years, taking the average of the results obtained at all the experimental farms, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 36 | 56 | 7. Mummy | 33 | 22 |
| 2. Carleton | 35 | 43 | 8. Archer, 3 yrs | 33 | 13 |
| 3. Pride | 34 | 43 | 9. Trilby | 33 | 10 |
| 4. New Potter | 34 | 16 | 10. Duke | 33 | 9 |
| 5. King, 3 yrs | 34 | 6 | 11. Prince Albert | 33 | 9 |
| 6. Paragon | 33 | 26 | 12. Centennial | 33 | 6 |

An average crop of 34 bushels 2 lbs. per acre.

## FOUR AND FIVE YEARS' EXPERIENCE WITH VARIETIES OF INDIAN CORN.

(Where not otherwise marked, the figures given are the results of five years' tests.)

The six varieties of Indian corn which have averaged the heaviest crops at the several experimental farms during the past four or five years are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage | 24 | 1,691 | 4. Thoroughbred White Flint | 24 | 15 |
| 2. Giant Prolific Ensilage | 24 | 493 | 5. Champion White Pearl | 20 | 1,309 |
| 3. Selected Leaming, 4 yrs | 24 | 194 | 6. Sanford | 20 | 310 |

An average crop of 23 tons 2 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per aere. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoroughbred White Flint | 15 | 1,944 | 4. Canada White Flint | 14 | 842 |
| 2. Red Cob Ensilage | 15 | 688 | 5. Selected Leaming, 4 yrs | 14 | 737 |
| 3. Sanford | 15 | 588 | 6. Angel of Midnight | 14 | 633 |

An average crop of 14 tons 1,905 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Angel of Midnight | 21 | 1,626 | 4. Red Cob Ensilage | 19 | 1,178 |
| 2. Longfellow | 20 | 480 | 5. Champion White Pearl | 19 | 742 |
| 3. Thoroughbred White Flint | 19 | 1,838 | 6. Selected Leaming, 4 yrs | 18 | 1,290 |

An average crop of 19 tons 1,859 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Prolific Ensilage | 11 | 1,138 | 4. Mamm. Eight-Rowed Flint | 10 | 1,605 |
| 2. Sanford | 11 | 444 | 5. Selected Leaming, 4 yrs. | 10 | 1,466 |
| 3. Red Cob Ensilage | 11 | 128 | 6. Champion White Pearl | 10 | 1,382 |

An average crop of 11 tons 27 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage | 24 | 1,529 | 4. Giant Prolific Ensilage | 21 | 724 |
| 2. Selected Leaming, 4 yrs | 24 | 1,110 | 5. Pride of the North | 20 | 617 |
| 3. King of the Earliest | 21 | 1,052 | 6. Angel of Midnight | 19 | 1,754 |

An average crop of 22 tons 131 lbs. per acre.

The six varieties of Indian corn which have produced the largest crops for the past four or five years, taking the average of the results obtained on all the experimental farms, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage | 19 | 243 | 4. Giant Prolific Ensilage | 17 | 755 |
| 2. Selected Leaming, 4 yrs | 18 | 959 | 5. Angel of Midnight | 16 | 1,695 |
| 3. Thoroughbred White Flint | 17 | 1,544 | 6. Champion White Pearl | 16 | 1,158 |

An average crop of 17 tons 1,392 lbs. per acre.

## FOUR YEARS' EXPERIENCE WITH VARIETIES OF TURNIPS.

The six varieties of turnips which have averaged the heaviest crops at the several experimental farms during the past four years are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top | 37 | 703 | 4. Jumbo | 33 | 1,292 |
| 2. Perfection Swede | 35 | 1 | 5. Prize Winner | 33 | 632 |
| 3. Mammoth Clyde | 34 | 860 | 6. Carter's Elephant | 33 | 550 |

An average crop of 34 tons 1,006 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Perfection Swede | 33 | 1,641 | 4. Mammoth Clyde | 31 | 202 |
| 2. Hartley's Bronze | 32 | 937 | 5. Champion Purple Top | 31 | 147 |
| 3. Selected Purple Top | 32 | 886 | 6. Carter's Elephant | 31 | 87 |

An average crop of 31 tons 1,983 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top | 27 | 1,506 | 4. Champion Purple Top | 24 | 1,242 |
| 2. Hartley's Bronze | 26 | 503 | 5. East Lothian. | 24 | 807 |
| 3. Perfection Swede | 25 | 1,711 | 6. Skirving's | 24 | 642 |

An average crop of 25 tons 1,068 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze | 20 | 557 | 4. Skirving's | 19 | 890 |
| 2. Selected Purple Top | 20 | 284 | 5. Champion Purple Top | 19 | 775 |
| 3. Perfection Swede | 19 | 1,905 | 6. Mammoth Clyde | 19 | 758 |

An average crop of 19 tons 1,528 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Bangholm Selected | 51 | 369 | 4. East Lothian | 43 | 1,114 |
| 2. Selected Purple Top | 45 | 987 | 5. Giant King | 42 | 1,807 |
| 3. Jumbo | 43 | 1,615 | 6. Prize Winner | 41 | 1,678 |

An average crop of 44 tons 1,595 lbs. per acre.

The six varieties of turnips which have produced the largest crops, taking the average of the results obtained on all the experimental farms for the past four years, are:—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top | 32 | 1,272 | 4. East Lothian | 29 | 1,847 |
| 2. Perfection Swede | 31 | 526 | 5. Hartley's Bronze | 29 | 995 |
| 3. Bangholm Selected | 30 | 1,606 | 6. Jumbo | 29 | 382 |

An average crop of 30 tons 1,104 lbs. per acre.

## FOUR YEARS' EXPERIENCE WITH VARIETIES OF MANGELS.

The six varieties of mangels which have averaged the heaviest crops at the several experimental farms for the past four years are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post | 38 | 615 | 4. Yellow Intermediate | 33 | 1,223 |
| 2. Giant Yellow Intermediate | 35 | 97 | 5. Giant Yellow Globe | 33 | 288 |
| 3. Mammoth Long Red | 34 | 887 | 6. Canadian Giant | 31 | 1,930 |

An average crop of 34 tons 840 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate | 31 | 213 | 4. Gate Post | 27 | 1,615 |
| 2. Yellow Intermediate | 30 | 926 | 5. Warden Orange Globe | 26 | 153 |
| 3. Giant Yellow Globe | 28 | 1,113 | 6. Mammoth Long Red | 25 | 1,820 |

An average crop of 28 tons 640 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 39 | 677 | 4. Gate Post | 37 | 1,817 |
| 2. Giant Yellow Intermediate | 39 | 160 | 5. Giant Yellow Globe | 35 | 636 |
| 3. Prize Mammoth Long Red | 37 | 1,834 | 6. Mammoth Long Red | 35 | 141 |

An average crop of 37 tons 877 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 24 | 312 | 4. Gate Post | 21 | 1,249 |
| 2. Champion Yellow Globe | 21 | 1,560 | 5. Golden Fleshed Tankard | 20 | 1,122 |
| 3. Giant Yellow Globe | 21 | 1,461 | 6. Giant Yellow Intermediate | 20 | 441 |

An average crop of 21 tons 1,357 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 46 | 44 | 4. Giant Yellow Intermediate | 34 | 1,138 |
| 2. Mammoth Long Red | 36 | 361 | 5. Prize Mammoth Long Red | 32 | 1,733 |
| 3. Gate Post | 34 | 1,668 | 6. Canadian Giant | 30 | 808 |

An average crop of 35 tons 1,625 lbs. per acre.

The six varieties of mangels which have produced the largest crops, taking the average of the results obtained at all the experimental farms, are:—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate | 34 | 1,438 | 4. Mammoth Long Red | 30 | 431 |
| 2. Gate Post | 32 | 193 | 5. Giant Yellow Globe | 29 | 526 |
| 3. Giant Yellow Intermediate | 32 | 10 | 6. Prize Mammoth Long Red | 28 | 1,964 |

An average crop of 31 tons 427 lbs. per acre.

## FOUR YEARS' EXPERIENCE WITH VARIETIES OF CARROTS.

The six varieties of carrots which have averaged the heaviest crops at the several experimental farms for the past four years are the following:—

CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mamm. White Intermediate | 28 | 100 | 4. Iverson's Champion | 26 | 470 |
| 2. Giant White Vosges | 26 | 1,098 | 5. Half Long White | 24 | 1,348 |
| 3. Improved Short White | 26 | 1,075 | 6. White Belgian | 24 | 730 |

An average crop of 26 tons 137 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White | 19 | 555 | 4. Improved Short White | 18 | 1,222 |
| 2. Mamm. White Intermediate | 18 | 1,591 | 5. Giant White Vosges | 18 | 821 |
| 3. Iverson's Champion | 18 | 1,461 | 6. Guerande or Oxheart | 15 | 997 |

An average crop of 18 tons 441 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Iverson's Champion | 15 | 140 | 4. Mamm. White Intermediate | 14 | 1,177 |
| 2. Half Long White | 14 | 1,645 | 5. Early Gem | 14 | 655 |
| 3. Giant White Vosges | 14 | 1,535 | 6. White Belgian | 12 | 1,960 |

An average crop of 14 tons 852 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs |
|---|---|---|---|---|---|
| 1. Half Long White | 11 | 605 | 4. Mamm. White Intermediate | 10 | 72 |
| 2. Improved Short White | 11 | 291 | 5. Giant White Vosges | 9 | 1,791 |
| 3. Iverson's Champion | 10 | 1,927 | 6. White Belgian | 9 | 1,239 |

An average crop of 10 tons 987 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White | 33 | 1,680 | 4. Yellow Intermediate | 31 | 571 |
| 2. Half Long White | 31 | 1,555 | 5. White Belgian | 29 | 483 |
| 3. Giant White Vosges | 31 | 1,060 | 6. Mamm. White Intermediate | 28 | 1,967 |

An average crop of 31 tons 219 lbs. per acre.

The six varieties of carrots which have produced the largest crops, taking the average of the results obtained on all the experimental farms for the past four years, are:—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White...... | 20 | 1,058 | 4. Mamm. White Intermediate | 20 | 181 |
| 2. Half Long White............ | 20 | 741 | 5. Iverson's Champion........ | 19 | 1,955 |
| 3. Giant White Vosges.......... | 20 | 461 | 6. White Belgian................ | 18 | 352 |

An average crop of 19 tons 1,791 lbs. per acre.

## THREE YEARS' EXPERIENCE WITH VARIETIES OF SUGAR BEETS.

The four varieties of sugar beets which have averaged the heaviest crops at the several experimental farms for the past four years are the following:—

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial.......... | 21 | 1,688 | 3. Danish Improved...... .... | 19 | 1,178 |
| 2. Wanzleben.................. | 21 | 313 | 4. Vilmorin's Improved. .. . | 17 | 925 |

An average crop of 20 tons 26 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar.............. | 24 | 133 | 3. Improved Imperial......... | 20 | 313 |
| 2. Danish Improved............ | 21 | 975 | 4. Wanzleben.................. | 19 | 1,021 |

An average crop of 21 tons 610 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved............ | 31 | 502 | 3. Red Top Sugar............ | 27 | 1,638 |
| 2. Wanzleben.................. | 28 | 1,970 | 4. Vilmorin's Improved........ | 26 | 392 |

An average crop of 28 tons 1,125 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Wanzleben................. | 14 | 1,535 | 3. Red Top Sugar... ........ | 13 | 1,731 |
| 2. Danish Improved........... | 14 | 495 | 4. Improved Imperial ........ | 12 | 1,872 |

An average crop of 13 tons 1,908 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial.......... | 24 | 40 | 3. Red Top Sugar........... | 23 | 705 |
| 2. Danish Improved............ | 23 | 992 | 4. Vilmorin's Improved.. .. .. | 22 | 1,694 |

An average crop of 23 tons 858 lbs. per acre.

The four varieties of sugar beets which have produced the largest crops, taking the average of the results obtained at all the experimental farms, are:—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved.... ....... | 22 | 28 | 3. Wanzleben................ | 20 | 1,975 |
| 2. Red Top Sugar.......... ... . | 21 | 593 | 4. Improved Imperial........ | 20 | 1,848 |

An average crop of 21 tons 611 lbs. per acre.

The Vilmorin's Improved, the only other variety which has been tested for three years, has given an average crop of 19 tons 460 lbs.

## FIVE YEARS' EXPERIENCE WITH VARIETIES OF POTATOES.

The twelve varieties of potatoes which have averaged the heaviest crops at the several experimental farms during the past five years are the following. (A few of the varieties which have been only four years under trial are so marked.)

### CENTRAL EXPERIMENTAL FARM, OTTAWA., ONT.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Holborn Abundance........ | 414 | 55 | 7. Carman No. 1.... ....... | 343 | 50 |
| 2. American Wonder.......... | 396 | 39 | 8. Early White Prize........ | 342 | 3 |
| 3. Late Puritan..... ......... | 369 | 6 | 9. State of Maine.......... .... | 338 | 41 |
| 4. Everett..................... | 364 | 45 | 10. Early Norther ......... ... | 338 | 20 |
| 5. Empire State ............. | 349 | 56 | 11. Seattle, 4 yrs.............. | 336 | 26 |
| 6. Seedling No. 230, 4 yrs .... | 349 | 48 | 12. Rochester Rose.. ......... | 335 | 48 |

An average crop of 356 bushels 41 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Seedling No. 230, 4 yrs ..... | 463 | 84 | 7. Pearce's Prize Winner..... | 370 | 22 |
| 2. Irish Daisy................. | 401 | 59 | 8. I. X. L................. | 366 | 30 |
| 3. Holborn Abundance......... | 398 | 52 | 9. Great Divide......... .. | 362 | 47 |
| 4. Reading Giant... ......... | 393 | 4 | 10. Vanier............... .... | 358 | 33 |
| 5. Carman No. 1.............. | 391 | 27 | 11. Clarke's No. 1...... | 357 | 25 |
| 6. Pride of the Market..... ... | 378 | 20 | 12. Dreer's Standard......... | 353 | 29 |

An average crop of 383 bushels 6 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Irish Daisy.................. | 411 | 35 | 7. Chicago Market........... | 378 | 35 |
| 2. Pearce's Prize Winner...... | 387 | 45 | 8. Carman No. 1............. | 375 | 28 |
| 3. Delaware............... ..... | 385 | 55 | 9. Great Divide......... ... | 372 | 32 |
| 4. Late Puritan........... ..... | 385 | 44 | 10. Clarke's No. 1...... ..... | 370 | 20 |
| 5. Dreer's Standard... ...... | 383 | 32 | 11. Empire State............ | 369 | 25 |
| 6. Early Norther, 4 yrs.... .... | 380 | 25 | 12. State of Maine.... ....... | 367 | 2 |

An average crop of 380 bushels 41 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. American Giant. ........ | 428 | 18 | 7. New Variety No. 1....... | 366 | 1 |
| 2. Lee's Favourite.... ....... | 403 | 36 | 8. Northern Spy........... | 365 | 43 |
| 3. American Wonder... .. .... | 389 | 4 | 9. Seedling No. 230, 4 yrs .... | 362 | 58 |
| 4. Lizzie's Pride.............. | 368 | 48 | 10. Early Sunrise............. | 360 | 30 |
| 5. Rochester Rose............ | 368 | 22 | 11. Early White Prize......... | 360 | 22 |
| 6. Brownell's Winner ... .... | 367 | .. | 12. Late Puritan.............. | 349 | 25 |

An average crop of 374 bushels 10 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Dakota Red | 383 | 52 | 7. Troy Seedling | 346 | 22 |
| 2. Clay Rose | 376 | 42 | 8. New Variety No. 1 | 343 | 34 |
| 3. Brownell's Winner | 372 | 10 | 9. Lee's Favourite | 337 | 26 |
| 4. Seedling No. 230, 4 yrs | 367 | 45 | 10. Late Puritan | 336 | 6 |
| 5. Irish Daisy | 362 | 4 | 11. Empire State | 325 | .. |
| 6. Reading Giant | 354 | 36 | 12. Rural Blush | 322 | .. |

An average crop of 352 bushels 18 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops, taking the average of the results obtained on all the experimental farms for the past five years, are:—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seedling No. 230, 4 yrs | 368 | 58 | 7. Carman No. 1 | 339 | 59 |
| 2. Irish Daisy | 365 | 45 | 8. State of Maine | 336 | 23 |
| 3. American Giant | 364 | 15 | 9. Clarke's No. 1 | 335 | 14 |
| 4. American Wonder | 359 | 57 | 10. Clay Rose | 334 | 21 |
| 5. Late Puritan | 349 | 59 | 11. New Variety No. 1 | 333 | 48 |
| 6. Empire State | 345 | 46 | 12. Dreer's Standard | 333 | 45 |

An average crop of 347 bushels 21 lbs. per acre.

## SUMMARY.

Amid the multitude of details given in this bulletin bearing on the relative productiveness of varieties, it is not practicable to summarize more than a few examples. No satisfactory conclusions on this subject can be reached from comparisons of the crops of varieties grown on the different experimental farms in any one year nor from comparisons of any one year with another, partly on account of the great differences in climate, the variations in season from year to year, and still further because many new varieties are introduced from time to time, all of which from the outset are placed in competition in the annual tests. It is only from results covering a series of years, with the *same varieties* under trial, that useful inferences can be drawn.

The average crops of oats and wheat for five years are taken as illustrations here, for the reason that they are the most important grain crops grown in Canada, and also because the list of varieties under test in both cases is large, thus affording greater opportunity for change in the relative position of the several sorts as to weight of crop from year to year. The number of varieties of oats which have been under test at all the experimental farms for five consecutive years is 41 and of spring wheat 31, and the results gived in this bulletin as to the 12 sorts which have given the largest average crops for the five years are necessarily limited to these examples. The average crop of these sorts for three years was given in 1897, for four years in 1898, and the results for five years will be found in the present issue. The twelve varieties of oats which have given the largest average crops for the periods named are here placed side by side, the different sorts being arranged in the order in which they have appeared each year, with the average yield in each case.

VARIETIES OF OATS TESTED FOR A SERIES OF YEARS.

| Name of Variety. | 1899. Average for 5 years. Per acre. Bush. | Lbs. | Name of Variety. | 1898. Average for 4 years. Per acre. Bush. | Lbs. | Name of Variety. | 1897. Average for 3 years. Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| Banner. .. ..... | 75 | 30 | Banner............ | 71 | 17 | American Beauty... | 72 | 10 |
| American Beauty... | 74 | 31 | American Beauty... | 71 | 16 | Banner............ | 72 | 7 |
| Columbus.......... | 71 | 23 | Columbus..... .... | 70 | 5 | Columbus..... .. . | 70 | 15 |
| Golden Giant....... | 71 | 12 | Golden Beauty...... | 67 | 17 | Golden Beauty...... | 69 | 1 |
| Bavarian.......... | 71 | 9 | Bavarian........... | 66 | 33 | White Schonen..... | 68 | 7 |
| Golden Beauty..... | 70 | 2 | Holstein Prolific.... | 66 | 18 | Early Golden Prolific | 67 | 26 |
| Holstein Prolific.... | 69 | 23 | White Schonen...... | 65 | 29 | Holstein Prolific.... | 67 | 18 |
| Early Golden Prolific | 69 | 4 | Early Golden Prolific | 65 | 27 | Improved Ligowo... | 66 | 18 |
| American Triumph. | 67 | 24 | Wallis ........ ..... | 65 | 16 | White Russian...... | 65 | 25 |
| Abundance ... .... | 67 | 24 | Abundance......... | 65 | 9 | Wallis.... ... ... | 65 | 18 |
| White Schonen.... | 67 | 24 | Golden Giant....... | 64 | 19 | Bavarian.. . ... | 64 | 33 |
| Wallis. .... .... | 67 | 23 | White Russian...... | 64 | 11 | Early Gothland. ... | 64 | 22 |
| Average yield.. | 70 | 13 | Average yield... | 67 | 4 | Average yield... | 67 | 32 |

From these figures it will be seen that of the forty-one varieties of oats which have been tested for five consecutive years only *fifteen* of these have appeared among the best 12, either in the averages of 3, 4 or 5 years. *Nine* of the varieties have appeared each time in the best 12, and *eleven* of those which appeared in the list for 1898 appear also in that for 1899. Taking the list of 1899 and comparing it with 1898, the names are the same in both, with the single exception of American Triumph, which has replaced the White Russian. Comparing the list of the best 12 sorts in 1899 with those of 1897, in addition to the change referred to, there are two others. Golden Giant has taken the place of Improved Ligowo and Abundance that of Early Gothland.

These three varieties which have thus fallen out of the list of the best twelve within the three years named have not, however, lost much ground. They stand in the records of the average yields for five years in the following order:—

| | |
|---|---|
| Early Gothland............... | 66 bush. 26 lbs. per acre. |
| White Russian............... | 66 " 2 " " |
| Improved Ligowo........ ..... | 64 " 30 " " |

The lowest of the three is only 1 bush. 27 lbs. less in average yield than the 12th in the present select list.

A comparison of the 31 varieties of spring wheat grown for five years shows very similar average results.

## VARIETIES OF SPRING WHEAT TESTED FOR A SERIES OF YEARS.

| Name of Variety. | 1899. Average for 5 years. Per acre. Bush. | Lbs. | Name of Variety. | 1898. Average for 4 years. Per acre. Bush. | Lbs. | Name of Variety. | 1897. Average for 3 years. Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|---|---|---|
| Preston | 32 | 40 | Preston | 32 | 17 | Preston | 33 | 4 |
| Wellman's Fife | 32 | 12 | Wellman's Fife | 31 | .. | Monarch | 31 | 2 |
| Monarch | 32 | 6 | Monarch | 30 | 58 | Wellman's Fife | 30 | 36 |
| Goose | 31 | 14 | Percy | 30 | 24 | White Fife | 30 | 25 |
| White Fife | 31 | .. | Red Fife | 30 | 23 | Rio Grande | 30 | 23 |
| Rio Grande | 30 | 53 | White Fife | 30 | 20 | Old Red River | 30 | 17 |
| White Connell | 30 | 46 | White Connell | 30 | 19 | Red Fife | 30 | 9 |
| Red Fife | 30 | 42 | Rio Grande | 30 | 1 | White Connell | 30 | 6 |
| Huron | 30 | 31 | Goose | 29 | 58 | Advance | 30 | .. |
| White Russian | 30 | 28 | Red Fern | 29 | 17 | Goose | 29 | 51 |
| Pringle's Champlain | 30 | 1 | Old Red River | 29 | 17 | Red Fern | 29 | 49 |
| Red Fern | 29 | 50 | Advance | 29 | 8 | Alpha | 29 | 37 |
| Average yield | 31 | 7 | Average yield | 30 | 17 | Average yield | 30 | 26 |

These figures show that of the 31 varieties of spring wheat tested for five consecutive years, *sixteen* have appeared in the lists of the best twelve in the averages of 3, 4 and 5 years. *Nine* of the varieties have appeared each time in the best 12. Comparing the list for 1899 with that for 1898 it will be seen that Huron, White Russian and Pringle's Champlain have replaced Percy, Advance and Old Red River, while a comparison of the results of 1899 with 1897 show that the varieties replaced that year were Advance, Old Red River and Alpha. Since Old Red River was dropped from the list in 1899 for several reasons, the present standing of the other varieties is all that can be given:—

*Average Yields for Five Years.*

| | |
|---|---|
| Alpha | 29 bush. 9 lbs. per acre. |
| Advance | 29 " 4 " " |
| Percy | 28 " 52 " " |

These have maintained their relative position fairly well, the lowest being only 58 lbs. per acre in average yield below the 12th in the select list.

In arranging these numerous plots each season no effort is made to give to any variety a specially good location, and since at several of the experimental farms the land often varies much in different parts of the same field, it seems quite remarkable that the results covering so long a period from tests of the same varieties in different climates have been so uniform in

character. The facts submitted appear to the writer to furnish very strong evidence in proof of the inherent productiveness of varieties. Further evidence of a similar character could be gathered from the results reported with other agricultural products, did space permit.

It is hoped that the facts which have been submitted here and elsewhere, will induce farmers everywhere to follow the example and teaching of the experimental farms. Pay increased attention to the choosing of the most promising sorts of seeds for sowing ; to the selection of the very best quality of seed, remembering the great law in nature that "like produces like." To these precautions add a judicious rotation of crops, with periodical manuring and the ploughing under of green clover, a careful preparation of the soil and early sowing. With these duties faithfully discharged, the farmer may confidently anticipate good crops, provided the season is reasonably favourable. Were such practice to become general an era of unprecedented prosperity in agriculture might be confidently predicted.

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

# THE STAVE SILO

BY

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## BULLETIN No. 35

JULY, 1900

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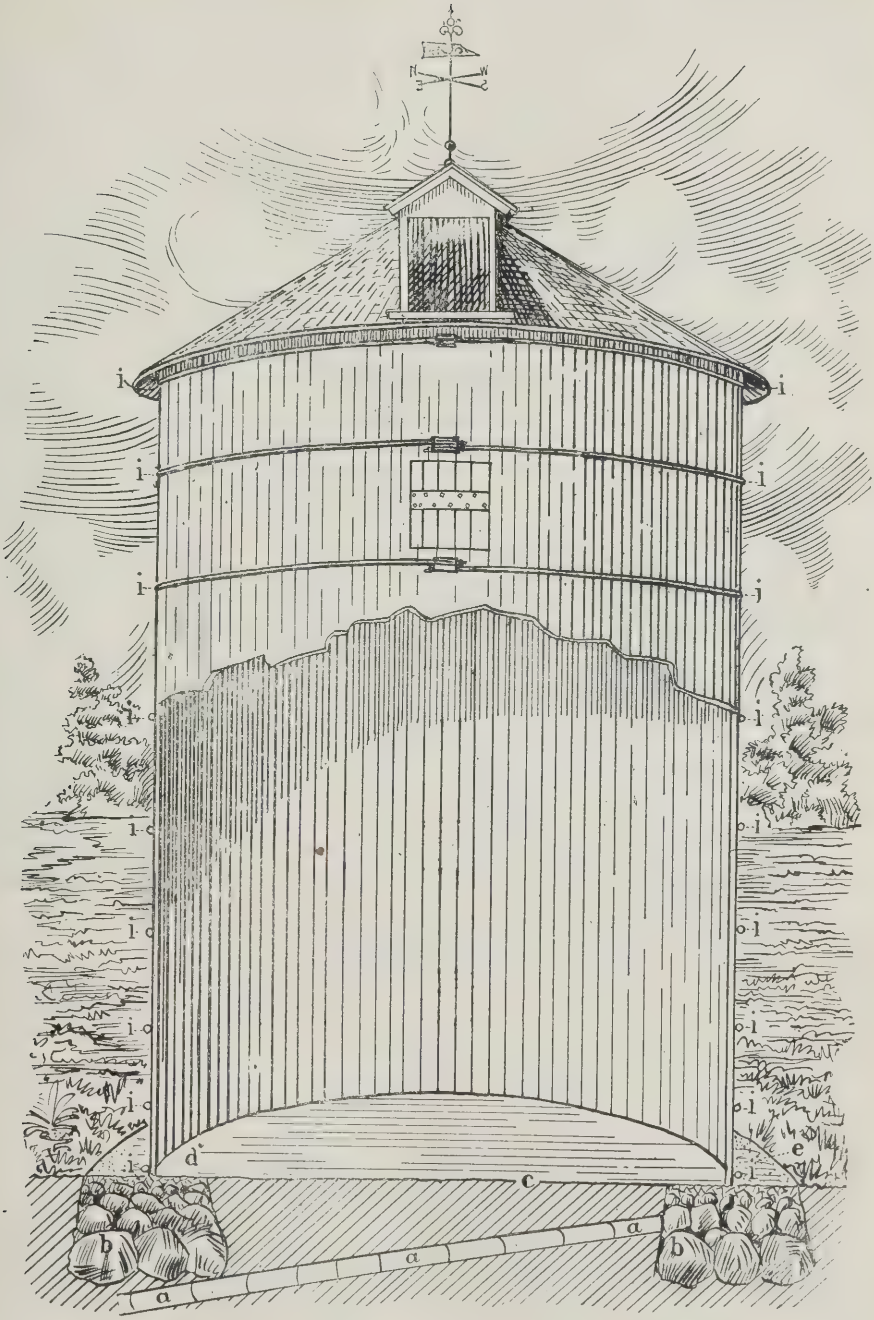


Fig. 5.—Longitudinal section of Stave Silo, showing: *a a a*, drain; *b*, foundation; *c*, ground floor; *d*, cement floor inside; *e*, cement floor outside; *i i i*, etc., hoops.

# CONTENTS

# THE STAVE SILO.

As the live stock of the country increase in number and improve in quality, more and more interest is taken in the preservation of succulent food for their use during the winter. In many parts of Canada the cheapest crop for such a purpose is Indian Corn (*Zea mays*) and since the preservation of this forage is an important consideration, so the question of silos and silo building is claiming more attention. Many letters have been received asking for directions for constructing silos and inquiring as to the relative economy of the different kinds of silo in use.

The most common objection advanced to the more general use of the silo is the considerable expenditure necessary to erect such a large air-tight chamber, as well as the subsequent expense of maintaining such a building in repair, and the apparent short life of the silo as commonly constructed.

From extensive observation and study of silos and silo construction, and from experience here with a number of different silos, it would appear that the tub or stave silo is the form of cheap silo that for various reasons is most worthy of recommendation. It combines simplicity and cheapness of construction with the requisite conditions, to preserve the ensilage in the very best condition for feeding.

No data are as yet available as to the longevity of the Stave Silo, its probable life depends, however, upon the quality of the material used and the proper construction of the foundation and sides.

The first point to decide when preparing to build is the amount of ensilage to be stored and the size of silo required for such an amount. A good average daily ration for a cow being from 35 lbs. to 40 lbs., the amount required for a given number of cattle during a certain period may be easily estimated. By referring to the following table, the approximate capacity of different sized tub silos may be ascertained :—

TABLE giving the approximate capacity of stave silos for well matured corn silage, in tons.

| Depth in Feet. | Inside Diameter in Feet. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | tons. | tons. | tons. | tons. | tons. | tons. | tons. | tons. | tons. | tons. |
| 20 | 58 | 66 | 75 | 84 | 94 | 104 | 115 | 126 | 138 | 150 |
| 21 | 62 | 71 | 80 | 90 | 100 | 111 | 123 | 135 | 147 | 161 |
| 22 | 67 | 76 | 86 | 96 | 107 | 119 | 131 | 144 | 153 | 172 |
| 23 | 71 | 81 | 92 | 103 | 115 | 127 | 140 | 154 | 168 | 183 |
| 24 | 76 | 86 | 97 | 109 | 122 | 135 | 149 | 163 | 179 | 194 |
| 25 | 80 | 89 | 103 | 116 | 129 | 143 | 158 | 173 | 189 | 206 |
| 26 | 85 | 97 | 109 | 123 | 137 | 151 | 167 | 183 | 200 | 218 |
| 27 | 90 | 102 | 115 | 129 | 144 | 160 | 176 | 194 | 212 | 230 |
| 28 | 94 | 108 | 122 | 136 | 152 | 168 | 186 | 204 | 223 | 243 |
| 29 | 99 | 113 | 128 | 143 | 160 | 177 | 195 | 214 | 234 | 255 |
| 30 | 105 | 119 | 134 | 151 | 168 | 186 | 205 | 225 | 246 | 268 |

In all silo construction, a most important point is to build as high as possible, since each foot added in height increases by so much the chance of success and gives a more than proportionate increase in capacity, due to the greater pressure of the taller column of material.

The silo may be built inside the barn or adjacent to it, as convenient. If built outside, it may be expected to prove as satisfactory as if built under cover, though scarcely so long-lived. While in the case of the unprotected tub silo, a small amount of ensilage may be frozen to the sides, especially on that side exposed to the prevailing winter wind, this may be mixed as it falls with the rest of the ensilage, and may be used without injury to the stock.

Probably the general method of building may be explained most clearly by going into the details of construction of a silo of a particular size.

## Construction of Stave Silo.

### *The Foundation.*

For a stave silo 20 ft. in diameter a circular trench 18 inches to 2 ft. wide and with an outer diameter of 22 ft. is dug about 2 feet deep or below the frost line.

The surface soil over the whole included area and for 2 ft. outside is removed to a depth of 10 or 12 inches at the same time.

The trench is then filled to the level of the interior with stone well pounded down, the surface stone being broken quite small and thin cement (1 part of cement to 4 of sand thoroughly mixed poured over, well worked in and left for a few days. This is followed by a coat of good cement (1 part cement to 3 sand), care being taken when finished to have the surface level and smooth.

Pure cement sprinkled on dry shortly after last coat and worked in with a trowel will make a superior finish.

Ample drainage should be provided (See fig. 5) whether the silo be built inside the barn or outside. This is essential to the preservation of both the silo and the ensilage. If any fear of rats be entertained, they may be guarded against by spreading a thin coat of grouting over the area inside the trench.

The above is to be preferred to cementing the entire interior because more economical and equally serviceable.

A stone wall might take the place of the above described foundation, but it would be necessary to line the inside with cement wherever the ensilage might be expected to touch it.

The top of the wall would also required a coat of cement in such case.

The circular line to mark the position of the staves might be drawn by means of some hard pointed article attached to a bit of string half the length of the diameter of the proposed silo. A spike driven in the centre might serve as a pivot.

### *The Staves.*

Any of our common soft woods may be used for staves. Hemlock, pine and spruce seem to be equally serviceable.

The staves may be from $1\frac{1}{2}$ to 3 inches thick, by from 5 to 9 inches wide. The smaller the silo the less must be the width of the stave. The best is probably 6 x 2 inches, dressed on the inside and sized square on the edge. By using the staves with a tongue and shallow groove, they may be expected to be more easily kept in place. A cross section of a stave so dressed and having a slight bevel is given in figure 1.

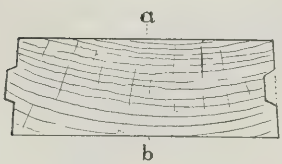


FIG. 1.—A section of a stave. The face *a* is $\frac{1}{16}$ to $\frac{1}{8}$ less than *b*.

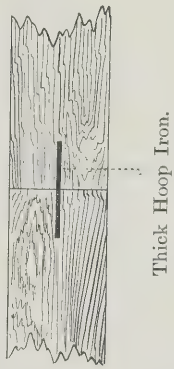


FIG. 2.—A stave splice.

In any case, great care must be taken to have lumber well sized and with no loose knots or shaky spots.

It will be found impossible to get staves much over 20 feet long, and so for a 30 foot silo it will be necessary to make up each stave from two or more pieces. These must be of exactly the same size. The ends should be carefully squared, and it is generally advisable to insert a bit of heavy hoop iron as shown in figure 2. This is not imperative, but where the parts of the stave are not connected in some way it will be necessary to insure the join coming immediately under a hoop.

### *Erecting the Silo.*

When built under cover it will usually be found easy to erect scaffolding for use in setting up the silo. Where the silo is built outside and over 20 feet high, the erection of scaffolding becomes rather more difficult.

One method is to erect 4 posts 6 x 6 the desired height and equidistant from each other, on, or 2 inches outside, the circle traced on the cement.

If placed on the circle they will take the place of staves.

These posts will serve in the place of clips for the hoops which may be made in two or four parts as preferred and tightened on the posts.

If the posts are used and the scaffolding erected outside the silo, it will be necessary to erect four other temporary posts of 2 x 4 material. A study of figure 3 will make this clear.

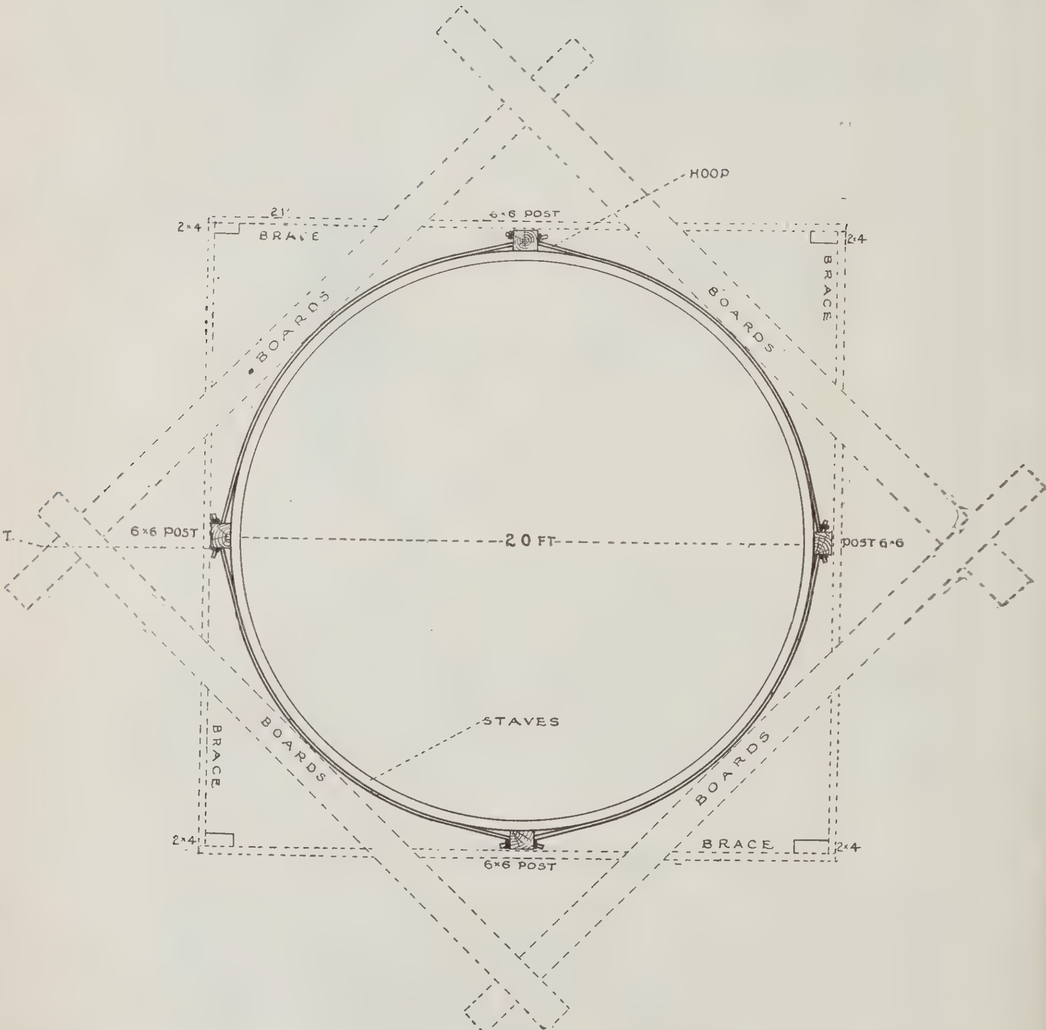


Fig. 3.—Plan of scaffolding that may be used when posts are employed instead of clips to hold the hoops in position. The 2 x 4 pieces are temporary posts supporting braces at intervals. Boards resting upon the braces form scaffolding.

A better, though somewhat more expensive plan is to erect scaffolding inside the silo. Three circular platforms of the exact diameter of the silo are constructed as shown in fig. 4. One is placed on the foundation, one near the splicing lines of the staves and one near the top. The staves may then be quickly and easily placed, toe nailed, hooped and the doors cut.

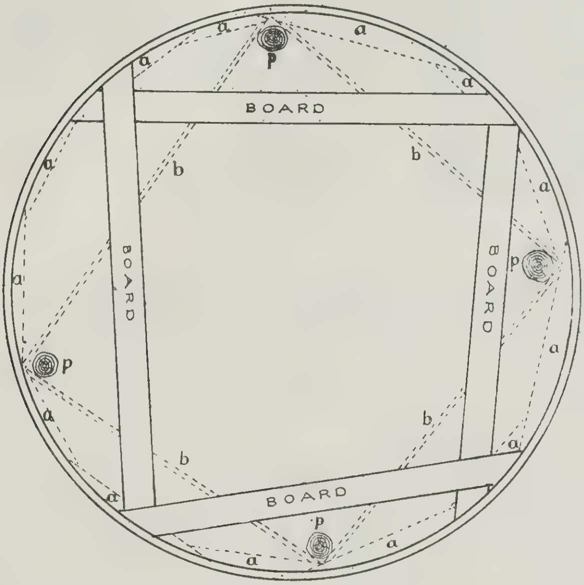


FIG. 4.—Plan of interior scaffolding, *a*, *a*, *a*, etc., boards cut as segments of 20 feet circle; *b*, *b*, *b*, *b*, braces nailed to *p*, *p*, *p*, *p* posts and extending to support circular platform made up of *a*, *a*, *a*, etc.

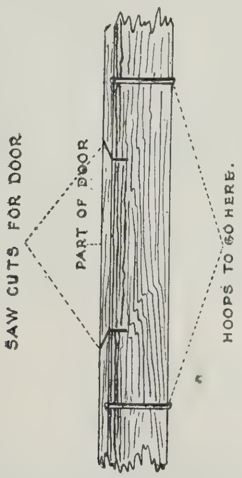


FIG. 6.—Part of stave showing saw cuts to be made for a door before erecting stave.

The doors should not be cut out till the silo is hooped, but preparation should be made for the cutting by selecting a stave which it is decided shall form part of the door and making saw cuts two or three inches deep along one edge at the top and bottom of each door (see fig. 6).

The door should be about 4 staves wide and about 18 inches high, or just large enough to admit a man.

The top and bottom should be sawn with a bevel in such a way as to cause the tightening of the joint by the pressure of the ensilage. The greater the bevel the better.

A glance at fig. 6 will show how and where the saw cuts should be made.

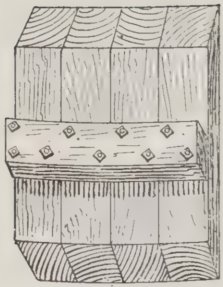

Fig. 7.—Door showing bevel and bar on outside.

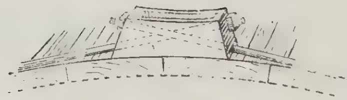

Fig. 8.—Showing clip made of wood or iron to be used where posts are not left in sides.

The parts of the door may be held in place by a 6-inch bar cut to fit the curve and to which each part is firmly bolted (see fig. 7).

*The Hoops.*

Round or flat hoops may be used. Round hoops in 2, 3 or 4 sections are the most easily handled. They may be joined by means of metal or wooden clips so bored as to admit of putting a nut on the exserted end of the rod, or by passing through the uprights as shown in figure 3.

They may be held in place by wire fencing staples driven in at intervals. When the silo is exposed to the weather, care should be taken that each stave is so attached to two or more hoops.

It will be found necessary to give the proper curve in the hook before attempting to put it in place. This is most easily done by using a tire bending machine such as may be found in any carriage or repair shop.

Round iron or steel $\frac{3}{4}$-inch through will be found strong enough for a 20-foot silo.

The hoops should be nearer together at the bottom and further apart towards the top. (See fig. 5.)

The first hoop should be not over 4 inches from the foundation.

The second about 18 inches from the first and the third 2 feet higher.

The space between hoops may gradually increase to $4\frac{1}{2}$ feet at the top.

Where the silo is built outside, it will be found necessary to roof it in most parts of Canada.

When posts form part of the silo wall they may be utilized as supports for the roof. In cases where posts have not been used, it will be found necessary to erect two or more or construct a frame work from 2 x 4 scantling to carry the roof. In any case, care must be taken to allow an opening for filling.

## A CHEAP RECTANGULAR SILO.

When it is not convenient or possible to build a stave silo, a very cheap rectangular one may be constructed by erecting strong (3 x 10) studding around a bay or part of a bay in a barn and lining with one ply good matched lumber one inch thick. Such a silo has been in use at the Central Experimental Farm for eight years and has given good results.

## CROPS FOR ENSILAGE.

The best material for ensilage appears to be corn, but almost any crop cut at the proper stage may be used.

Clover has been used with success in some parts, but it is rather uncertain as its peculiarities have not been studied sufficiently as yet. The conditions necessary for success with this plant and the exact stage of cutting appear to be more exacting than in the case of corn (*Zea mays.*) Any plants with hollow stems as rye or clover are more uncertain of curing properly than those with solid stems as Indian corn or mangold tops.

### Preparation of Material.

Most material for ensilage seems to give best results when cut previous to storing in silo.

Indian corn put in uncut has been known to come out in good shape, but the loss from feeding the long coarse stalks and the uncertainty of properly curing much more than make up for the trouble of cutting.

Clover has been a success in many instances when put in the silo uncut.

Sorghum, where it can be grown, makes an excellent crop for ensilage. It needs to be cut. The best length to cut corn, &c., for the silo is into pieces three quarters of an inch long.

## FILLING THE SILO.

In filling the silo it will be found an excellent plan to have the material as it falls from the carrier or blower descend through a tube made up of a number of salt sacks tacked together with the bottoms out. By this means it will be found possible to mix the leaves and stems much more thoroughly and easily than where forks are used in keeping the surface level.

Packing the ensilage evenly in all parts of the silo is a considerable factor in the quality of the finished product.

The silo should be filled to the top, allowed to settle, then filled again.

This filling up operation should be continued as long as possible.

The ensilage needs no pressure on the top nor cover of any kind as it very soon forms a layer of partially decayed matter 2 or 3 inches thick, quite impervious to air, which serves as a protector for the rest of the contents of the silo. This process may be hastened, however, and a small saving of ensilage effected by pouring about a pail of water to the foot of surface and sowing oats thickly over it, or by scattering chaff on top and wetting it in the same way.

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

## RESULTS OBTAINED IN 1900

FROM

## TRIAL PLOTS OF GRAIN, FODDER CORN, FIELD ROOTS AND POTATOES

Trial Plots at Experimental Farm, Brandon, Man.

By Wm. SAUNDERS, LL.D.,
*Director Experimental Farms*

## BULLETIN No. 36.

DECEMBER, 1900

Published by Direction of the Hon. Sydney A. Fisher, Minister of Agriculture

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To the Honourable

The Minister of Agriculture.

SIR,—I beg to submit for your approval Bulletin No. 36 of the Experimental Farm series, prepared by myself. In this publication there are presented the results of a large number of experiments which have been conducted at all the experimental farms under your department during the season of 1900, with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots, sugar beets and potatoes, in uniform plots. The average results are also given of five and six years' tests on such plots with varieties of oats, barley, spring wheat and Indian corn, three to six years' with plots of pease, four and five years' with plots of turnips, mangels, carrots and potatoes, and three and four years' experience with sugar beets.

This work of testing varieties is being conducted with the object of gaining information as to their relative productiveness and earliness in ripening. The results show wide variations in the weight of the crops grown and indicate the importance of the exercise of care in the choice of varieties of seed for sowing. It is hoped that the results presented, covering the experience gained under some of the most important climatic variations found in the Dominion, will prove useful to farmers in every part of Canada.

I have the honour to be

Your obedient servant,

WM. SAUNDERS,

*Director Experimental Farms.*

OTTAWA, 3rd December, 1900.

# RESULTS OBTAINED IN 1900

FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN, FIELD ROOTS AND POTATOES

By William Saunders, LL.D., F.R.S.C., F,L.S., &c.

*Director Experimental Farms.*

For the past five years an annual bulletin has been published, giving the results obtained from the uniform trial plots of grain, fodder corn, field roots and potatoes at each of the Dominion Experimental Farms, with the object of showing the relative productiveness and earliness of the many varieties under test. The average results which have been had with these crops for a series of years are also given. The present issue giving the particulars regarding these trial plots for 1900 is the sixth in the series, and shows an excellent average for most of the crops on the eastern experimental farms at Ottawa and Nappan, and good crops in most cases at Agassiz, B.C. At the Brandon and Indian Head farms on the western plains unfavourable conditions of weather have prevailed. There was a severe drought in the early part of the season, followed by strong winds, and later by unusually heavy and frequent rains. The seeds did not germinate evenly in the dry soil in the spring, the young plants also suffered more or less from spring frosts; later, winds injured the crops in exposed plots, and during the wet weather in harvest time they were further damaged. For these reasons the returns from the farms named are very incomplete, many varieties having proved a failure. To publish such particulars as can be had, in the usual way would give no correct information as to the comparative productiveness of the varieties under test and could only be misleading. On this account the yields of oats, barley, spring wheat and pease at Indian Head are omitted, also the particulars regarding the trial plots of oats, barley and wheat at Brandon. These details as far as they are available will be found in the Annual Report of the Experimental Farms for 1900, and a summary of the range of the crops in each case will be given in this bulletin under the separate headings.

Some varieties of pease suffered from unfavourable weather at Brandon, but the injury was not such as to prevent the details of this crop being given. Mangels have been hurt considerably by bad weather both at Brandon and Indian Head, and the yields of many sorts are light. Carrots have been a complete failure at Indian Head, and the first sowing, owing to drought, failed to germinate at Brandon; the seed of the second sowing was late in starting and the crop is unusually small. Sugar beets at Agassiz were a failure. The weather

was wet and cold for some time after they were sown, and very few of the seeds germinated. Later the few growing plants were so badly injured by cut worm that the plots were ploughed up.

In arranging the experiments reported on in this bulletin the same varieties have been sown at each of the Experimental Farms. The land chosen for the plots has been as nearly uniform in character as possible and the soil was brought by cultivation into a good condition of tilth. The seed has been sown early, and well cleaned and screened before sowing so as to separate the smaller kernels, leaving only the plump and well matured grain. In most cases all the varieties of the same cereal have been sown on the same day, or at most within two or three days, so as to give to all an even start. During the past ten years many new sorts of cereals have been originated on the Experimental Farms, some of these are included in the tests and the names of such are given in each case in the paragraph preceding the table of returns.

In the tables the varieties are placed in the order of their productiveness at the Central Experimental Farm. The number of days required for each sort from sowing to ripening is also added and thus their relative earliness is shown.

In comparing the results of any one single year with another the relative position in point of productiveness occupied by varieties will often vary, either from lack of uniformity in the soil or from some other cause, but the average experience gained by the continuance of these tests for a series of years affords much more satisfactory evidence on this subject. In the second part of this bulletin particulars are given drawn from experience gained during the past six years at all the Experimental Farms which should be of much value to Canadian farmers.

## TRIAL PLOTS OF OATS.

Fifty-nine varieties of oats have been tested during the season of 1900. These include twelve cross-bred sorts which have been originated at the Experimental Farms, namely, Cromwell, Holland, Olive, Oxford, Pense, Miller, Brandon, Milford, King, Kendal, Master, and Russell. The size of the plots on which these oats were sown was one-fortieth of an acre each at Ottawa, Ont., Nappan, N.S., and Agassiz, B.C. The quantity of seed sown of each variety was in the proportion of two bushels per acre and the dates of sowing were as follows: At Ottawa, May 4th; Nappan, May 17th; and at Agassiz, April 16th.

Particulars as to the character of the land in each case, also the preparation and treatment it has had, will be found in the Annual Report of the Experimental Farms for 1900.

For reasons submitted on page 5 no returns are given in the appended table from the branch farms at Brandon and Indian Head. The plots of oats at Brandon varied in yield from 71 bushels 16 lbs. to 9 bushels 4 lbs. per acre. At Indian Head reports are available for 9 plots only out of 59, these have given from 76 bushels 16 lbs. to 32 bushels 12 lbs. per acre.

## UNIFORM TEST PLOTS OF OATS.

| Number. | Name of Variety. | Yield per Acre at the Three Experimental Farms, Season of 1900. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of Three Farms. Bush. | Average of Three Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Agassiz, B.C. Days. | Average of Three Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Holstein Prolific..... | 82 | 18 | 91 | 26 | 58 | 28 | 77 | 24 | 102 | 104 | 118 | 108 |
| 2 | White Giant......... | 78 | 8 | 62 | 12 | 46 | 6 | 62 | 9 | 102 | 116 | 114 | 111 |
| 3 | Black Beauty....... | 76 | 16 | 95 | 10 | 58 | 28 | 76 | 29 | 104 | 100 | 111 | 105 |
| 4 | Hazlett's Seizure..... | 74 | 24 | 76 | 16 | 50 | 30 | 67 | 12 | 104 | 105 | 118 | 109 |
| 5 | Oderbruch .......... | 73 | 32 | 75 | 10 | 53 | 28 | 67 | 23 | 103 | 103 | 113 | 106 |
| 6 | California Prolific Blk | 72 | 32 | 76 | 16 | 53 | 18 | 67 | 22 | 108 | 102 | 118 | 109 |
| 7 | Joanette............. | 70 | 20 | 91 | 26 | 43 | 18 | 66 | 21 | 112 | 100 | 119 | 110 |
| 8 | Early Blossom....... | 70 | 20 | 85 | 30 | 56 | 16 | 70 | 33 | 105 | 102 | 115 | 107 |
| 9 | Golden Tartarian.... | 69 | 14 | 68 | 8 | 48 | 18 | 62 | 2 | 110 | 116 | 118 | 115 |
| 10 | Golden Giant........ | 68 | 28 | 84 | 24 | 57 | 12 | 70 | 10 | 110 | 105 | 120 | 112 |
| 11 | American Beauty.... | 68 | 8 | 70 | 20 | 50 | .. | 62 | 32 | 102 | 102 | 120 | 108 |
| 12 | Cromwell .......... | 68 | 8 | 87 | 2 | 54 | 4 | 69 | 27 | 102 | 116 | 114 | 111 |
| 13 | Holland............. | 68 | 8 | 68 | 8 | 53 | 8 | 63 | 8 | 110 | 100 | 118 | 109 |
| 14 | Olive ............... | 67 | 22 | 67 | 2 | 51 | 16 | 63 | 2 | 105 | 105 | 116 | 109 |
| 15 | Buckbee's Illinois ... | 67 | 2 | 90 | 20 | 50 | 10 | 69 | 12 | 101 | 103 | 119 | 108 |
| 16 | Oxford.............. | 65 | 30 | 62 | 12 | 38 | 28 | 55 | 23 | 102 | 110 | 119 | 110 |
| 17 | Bavarian ........... | 65 | 10 | 87 | 2 | 47 | 32 | 66 | 26 | 110 | 103 | 118 | 110 |
| 18 | Prolific Blk. Tartarian | 64 | 24 | 67 | 2 | 52 | 12 | 61 | 13 | 108 | 102 | 118 | 109 |
| 19 | Banner.............. | 64 | 4 | 74 | 4 | 52 | 22 | 63 | 21 | 104 | 100 | 118 | 107 |
| 20 | Wide Awake........ | 63 | 18 | 88 | 8 | 41 | 18 | 64 | 15 | 106 | 105 | 119 | 110 |
| 21 | Mennonite .......... | 63 | 8 | 74 | 4 | 54 | 24 | 64 | 1 | 107 | 105 | 113 | 108 |
| 22 | Improved Ligowo.... | 62 | 12 | 74 | 4 | 52 | 12 | 62 | 31 | 102 | 102 | 114 | 106 |
| 23 | Wallis .............. | 62 | 12 | 92 | 32 | 43 | 18 | 66 | 9 | 104 | 105 | 118 | 109 |
| 24 | Early Archangel..... | 61 | 7 | 76 | 16 | 45 | 20 | 61 | 3 | 102 | 98 | 118 | 106 |
| 25 | White Schonen...... | 61 | 6 | 82 | 12 | 49 | 14 | 64 | 11 | 104 | 100 | 114 | 106 |
| 26 | Early Golden Prolific | 61 | 6 | 80 | .. | 55 | 20 | 65 | 20 | 105 | 103 | 113 | 107 |
| 27 | Flying Scotchman... | 61 | 6 | 75 | 10 | 51 | 16 | 62 | 22 | 99 | 104 | 113 | 105 |
| 28 | Pense............... | 61 | 6 | 72 | 32 | 46 | 16 | 60 | 7 | 105 | 104 | 120 | 110 |
| 29 | Impd. Ligowo, Imp.. | 60 | .. | 77 | 22 | 49 | 24 | 62 | 15 | 102 | 102 | 114 | 106 |
| 30 | New Zealand........ | 60 | .. | 67 | 2 | 50 | 30 | 59 | 11 | 113 | 116 | 119 | 116 |
| 31 | Prolific Blk. Tartarian Imp ............... | 59 | 14 | 70 | 20 | 59 | 14 | 63 | 5 | 108 | 102 | 118 | 109 |
| 32 | California Prol. Blk. Imp .............. | 59 | 14 | 85 | 30 | 56 | 6 | 67 | 5 | 108 | 103 | 118 | 110 |
| 33 | American Triumph.. | 58 | 28 | 70 | 20 | 53 | 18 | 60 | 33 | 107 | 103 | 118 | 109 |
| 34 | Abundance.......... | 58 | 8 | 68 | 8 | 52 | 22 | 59 | 24 | 110 | 102 | 118 | 110 |
| 35 | Danish Island....... | 58 | 8 | 90 | 20 | 37 | 22 | 62 | 5 | 105 | 98 | 115 | 106 |
| 36 | Thousand Dollar..... | 58 | 8 | 84 | 24 | 58 | 8 | 67 | 2 | 101 | 102 | 113 | 105 |
| 37 | Columbus........... | 57 | 22 | 62 | 12 | 57 | 12 | 59 | 4 | 102 | 105 | 113 | 107 |
| 38 | Abyssinia ........... | 57 | 22 | 69 | 18 | 57 | 22 | 61 | 21 | 104 | 102 | 118 | 108 |
| 39 | Early Maine......... | 57 | 2 | 85 | 30 | 49 | 4 | 64 | 1 | 102 | 105 | 119 | 109 |
| 40 | Miller............... | 56 | 16 | 60 | .. | 45 | 30 | 54 | 4 | 104 | 104 | 118 | 109 |
| 41 | Newmarket ......... | 56 | 16 | 83 | 18 | 40 | .. | 60 | .. | 103 | 105 | 118 | 109 |
| 42 | Brandon ............ | 55 | 10 | 76 | 16 | 43 | 18 | 58 | 15 | 110 | 103 | 116 | 110 |
| 43 | Lincoln............. | 55 | 10 | 89 | 14 | 53 | 8 | 65 | 33 | 103 | 106 | 116 | 108 |
| 44 | Golden Beauty...... | 54 | 4 | 94 | 4 | 45 | 30 | 64 | 24 | 112 | 105 | 120 | 112 |
| 45 | Rosedale...... .... | 54 | 4 | 80 | .. | 50 | 20 | 61 | 19 | 102 | 103 | 120 | 108 |
| 46 | Milford ............. | 52 | 32 | 68 | 8 | 48 | 28 | 56 | 25 | 105 | 105 | 119 | 110 |

UNIFORM TEST PLOTS OF OATS—*Concluded*,

| Number. | Name of Variety. | Yield per Acre at the Three Experimental Farms, Season of 1900. Ottawa, Ont. Bush. | Lbs. | Nappan, N.S. Bush. | Lbs. | Agassiz, B.C. Bush. | Lbs. | Average of Three Farms. Bush. | Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Agassiz, B.C. Days. | Average of Three Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | Salines | 51 | 26 | 74 | 4 | 50 | .. | 58 | 21 | 113 | 109 | 118 | 113 |
| 48 | Sensation | 51 | 26 | 72 | 32 | 42 | 4 | 55 | 21 | 102 | 99 | 113 | 105 |
| 49 | White Russian | 51 | 26 | 75 | 10 | 48 | 18 | 58 | 18 | 105 | 102 | 113 | 107 |
| 50 | Early Gothland | 51 | 26 | 69 | 18 | 45 | 30 | 55 | 25 | 102 | 99 | 114 | 105 |
| 51 | Siberian | 50 | 20 | 70 | 20 | 51 | 6 | 57 | 15 | 108 | 103 | 119 | 110 |
| 52 | King | 50 | 20 | 62 | 12 | 42 | 18 | 51 | 28 | 106 | 103 | 118 | 109 |
| 53 | Improved American | 50 | 20 | 80 | .. | 54 | 14 | 61 | 23 | 105 | 103 | 116 | 108 |
| 54 | Bonanza | 50 | 20 | 88 | 8 | 42 | 18 | 60 | 15 | 98 | 102 | 115 | 105 |
| 55 | Kendal | 48 | 8 | 87 | 2 | 55 | 20 | 63 | 21 | 111 | 104 | 119 | 111 |
| 56 | Master | 42 | 12 | 70 | 20 | 51 | 16 | 54 | 27 | 104 | 105 | 120 | 110 |
| 57 | Black Mesdag | 41 | 6 | 88 | 8 | 54 | 24 | 61 | 13 | 101 | 92 | 112 | 102 |
| 58 | Russell | 41 | 6 | 63 | 18 | 43 | 18 | 49 | 14 | 105 | 110 | 119 | 111 |
| 59 | Cream Egyptian | 35 | 30 | 76 | 16 | 46 | 16 | 52 | 32 | 108 | 98 | 120 | 109 |

The twelve varieties of oats which have produced the largest crops during 1900 at the three experimental farms are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holstein Prolific | 82 | 18 | 7. Joanette | 70 | 20 |
| 2. White Giant | 78 | 8 | 8. Early Blossom | 70 | 20 |
| 3. Black Beauty | 76 | 16 | 9. Golden Tartarian | 69 | 14 |
| 4. Hazlett's Seizure | 74 | 24 | 10. Golden Giant | 68 | 28 |
| 5. Oderbruch | 73 | 32 | 11. American Beauty | 68 | 8 |
| 6. California Prolific Black | 72 | 32 | 12. Cromwell | 68 | 8 |

An average crop of 72 bushels 30 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Black Beauty | 95 | 10 | 7. Buckbee's Illinois | 90 | 20 |
| 2. Golden Beauty | 94 | 4 | 8. Lincoln | 89 | 14 |
| 3. Wallis | 92 | 32 | 9. Black Mesdag | 88 | 8 |
| 4. Holstein Prolific | 91 | 26 | 10. Wide Awake | 88 | 8 |
| 5. Joanette | 91 | 26 | 11. Bonanza | 88 | 8 |
| 6. Danish Island | 90 | 20 | 12. Bavarian | 87 | 2 |

An average crop of 90 bushels 23 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Prol. Blk. Tartarian | 59 | 14 | 7. Golden Giant | 57 | 12 |
| 2. Holstein Prolific | 58 | 28 | 8. Early Blossom | 56 | 16 |
| 3. Black Beauty | 58 | 28 | 9. California Prol. Black. | 56 | 6 |
| 4. Thousand Dollar | 58 | 8 | 10. Kendal | 55 | 20 |
| 5. Abyssinia | 57 | 22 | 11. Early Golden Prolific | 55 | 20 |
| 6. Columbus | 57 | 12 | 12. Mennonite | 54 | 24 |

An average crop of 57 bushels 6 lbs. per acre.

The twelve varieties which have produced the largest crops in 1900 taking the average results obtained on the three experimental farms are:

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holstein Prolific | 77 | 24 | 7. Oderbruch | 67 | 23 |
| 2. Black Beauty | 76 | 29 | 8. California Prolific, Blk. | 67 | 22 |
| 3. Early Blossom | 70 | 33 | 9. Hazlett's Seizure | 67 | 12 |
| 4. Golden Giant | 70 | 10 | 10. Thousand Dollar | 67 | 2 |
| 5. Cromwell | 69 | 27 | 11. Joanette | 66 | 21 |
| 6. Buckbee's Illinois | 69 | 12 | 12. Bavarian | 66 | 26 |

An average crop of 69 bushels 29 lbs. per acre.

The average crop of all the varieties of oats tested at each of the three experimental farms in 1900 was as follows:—At Ottawa 60 bushels 2 lbs.; Nappan 77 bushels 11 lbs., and at Agassiz 50 bushels 5 lbs. per acre. The average return given by the whole of the varieties tested at the three farms named was 62 bushels 17 lbs. per acre.

## TRIAL PLOTS OF BARLEY.

Forty-seven varieties of barley have been tested in the trial plots during 1900, including eighteen different sorts of two-rowed barley and twenty-nine of six-rowed. Among the two-rowed sorts there are twelve hybrid varieties which have been produced at the experimental farms, namely, Beaver, Bolton, Jarvis, Clifford, Harvey, Dunham, Victor, Nepean, Fulton, Sidney, Logan and Leslie. Among the six-rowed sorts there are seventeen of these hybrids, namely, Pioneer, Argyle, Summit, Albert, Vanguard, Claude, Surprise, Success, Nugent, Trooper, Mansfield, Stella, Garfield, Empire, Phœnix, Yale and Brome.

The barley plots were of the same size as those sown with oats. Two bushels of seed was used per acre in each case, and the dates of sowing were as follows: At Ottawa, May 1st; Nappan, May 30th, and at Agassiz on April 20th.

For reasons submitted on page 5 no returns are given in the appended tables from the branch farms at Brandon and Indian Head. The plots of two-rowed barley at Brandon varied in yield from 34 bushels 18 lbs. to 16 bushels 42 lbs. per acre, and the plots of six-rowed barley from 42 bushels 34 lbs. to 15 bushels 10 lbs. per acre. At Indian Head eight plots only out of eighteen of two-rowed barley are reported on, which have varied in yield from 34 bushels 8 lbs. to 15 bushels per acre; particulars are given of the crops of eighteen out of twenty-nine sorts of six-rowed barley, which have ranged from 55 bushels to 24 bushels 28 lbs. per acre.

## UNIFORM TEST PLOTS OF TWO-ROWED BARLEY.

| Number. | Name of Variety. | Yield per Acre at the Three Experimental Farms, Season of 1900. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of Three Farms. Bush. | Average of Three Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Agassiz, B.C. Days. | Average of Three Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Canadian Thorpe .... | 58 | 16 | 58 | 16 | 31 | 32 | 49 | 21 | 98 | 93 | 108 | 100 |
| 2 | French Chevalier.... | 56 | 32 | 55 | .. | 34 | 28 | 48 | 36 | 97 | 94 | 109 | 100 |
| 3 | Beaver ............. | 54 | 8 | 65 | .. | 34 | 8 | 51 | 5 | 97 | 92 | 109 | 99 |
| 4 | Bolton ............. | 52 | 24 | 50 | .. | 31 | 42 | 44 | 38 | 95 | 92 | 102 | 96 |
| 5 | Danish Chevalier .... | 51 | 32 | 63 | 16 | 37 | 4 | 50 | 33 | 97 | 93 | 110 | 100 |
| 6 | Jarvis ............. | 50 | 20 | 25 | 40 | 41 | 32 | 39 | 14 | 97 | 94 | 102 | 98 |
| 7 | Newton ............. | 50 | .. | 47 | 24 | 31 | 22 | 43 | 6 | 99 | 93 | 108 | 100 |
| 8 | Clifford ............ | 50 | .. | 45 | .. | 28 | 8 | 41 | 3 | 97 | 93 | 108 | 99 |
| 9 | Harvey ............. | 50 | .. | 40 | 40 | 33 | 28 | 41 | 23 | 95 | 94 | 110 | 100 |
| 10 | Dunham ............ | 49 | 8 | 44 | 8 | 30 | 10 | 41 | 9 | 99 | 94 | 104 | 99 |
| 11 | Victor ............. | 49 | 8 | 28 | 16 | 34 | 38 | 37 | 21 | 97 | 94 | 109 | 100 |
| 12 | Nepean ............ | 49 | 8 | 40 | .. | 41 | 22 | 43 | 26 | 99 | 92 | 102 | 98 |
| 13 | Fulton ............. | 47 | 44 | 32 | 24 | 30 | 10 | 36 | 42 | 99 | 94 | 110 | 101 |
| 14 | Sidney ............. | 45 | .. | 42 | 24 | 30 | 20 | 39 | 15 | 95 | 94 | 107 | 99 |
| 15 | Logan .............. | 43 | 16 | 39 | 8 | 29 | 18 | 37 | 14 | 99 | 93 | 104 | 99 |
| 16 | Leslie.............. | 40 | 40 | 25 | .. | 29 | 18 | 31 | 35 | 97 | 93 | 109 | 100 |
| 17 | Kinver Chevalier.... | 37 | 44 | 40 | .. | 32 | 24 | 36 | 39 | 97 | 94 | 108 | 100 |
| 18 | Prize Prolific........ | 26 | 46 | 46 | 32 | 36 | 12 | 36 | 30 | 105 | 94 | 109 | 103 |

The six varieties of two-rowed barley which have given the largest crops at the three experimental farms during 1900 are the following :

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|
| 1. Canadian Thorpe....... | 58 | 16 |
| 2. French Chevalier....... | 56 | 32 |
| 3. Beaver ................ | 54 | 8 |
| 4. Bolton ............... | 52 | 24 |
| 5. Danish Chevalier....... | 51 | 32 |
| 6. Newton ............... | 50 | .. |

An average crop of 53 bushels 42 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|
| 1. Beaver ................ | 65 | .. |
| 2. Danish Chevalier....... | 63 | 16 |
| 3. Canadian Thorpe....... | 58 | 16 |
| 4. French Chevalier ...... | 55 | .. |
| 5. Bolton ................ | 50 | .. |
| 6. Newton................ | 47 | 24 |

An average crop of 56 bushels 25 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Jarvis | 41 | 32 | 4. Prize Prolific | 36 | 12 |
| 2. Nepean | 41 | 22 | 5. Victor | 34 | 38 |
| 3. Danish Chevalier | 37 | 4 | 6. French Chevalier | 34 | 28 |

An average crop of 37 bushels 31 lbs. per acre.

The six varieties of two-rowed barley which have given the largest crops in 1900, taking the average of the results obtained on the three experimental farms, are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver | 51 | 5 | 4. French Chevalier | 48 | 36 |
| 2. Danish Chevalier | 50 | 33 | 5. Bolton | 44 | 38 |
| 3. Canadian Thorpe | 49 | 21 | 6. Nepean | 43 | 26 |

An average crop of 48 bushels 2 lbs. per acre.

The average crop of all the varieties of two-rowed barley tested at the three experimental farms in 1900 was as follows :—At Ottawa, 48 bushels ; Nappan, 43 bushels 40 lbs., and at Agassiz, 33 bushels 11 lbs. per acre. The average return given by the whole of the varieties at the three farms named was 41 bushels 33 lbs. per acre.

UNIFORM TEST PLOTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield per Acre at the Three Experimental Farms, Season of 1900. | | | | | | | | Number of Days from Sowing to Harvesting. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Agassiz, B.C. | | Average of Three Farms. | | Ottawa, Ont. | Nappan, N.S. | Agassiz, B.C. | Average of Three Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. |
| 1 | Mensury | 60 | .. | 60 | .. | 44 | 8 | 54 | 35 | 94 | 92 | 97 | 94 |
| 2 | Pioneer | 60 | .. | 45 | 40 | 35 | 40 | 47 | 11 | 94 | 86 | 102 | 94 |
| 3 | Common | 59 | 8 | 53 | 16 | 38 | 42 | 50 | 22 | 91 | 87 | 105 | 94 |
| 4 | Royal | 58 | 8 | 56 | 32 | 32 | 14 | 49 | 2 | 93 | 86 | 103 | 94 |
| 5 | Argyle | 56 | 32 | 40 | .. | 36 | 22 | 44 | 18 | 94 | 89 | 103 | 95 |
| 6 | Odessa | 55 | .. | 51 | 32 | 40 | 20 | 49 | 1 | 93 | 87 | 97 | 92 |
| 7 | Petschora | 54 | 8 | 52 | 24 | 39 | 38 | 48 | 39 | 91 | 86 | 94 | 90 |
| 8 | Summit | 54 | 8 | 40 | .. | 29 | 38 | 41 | 15 | 95 | 93 | 110 | 99 |
| 9 | Albert | 53 | 16 | 57 | 24 | 38 | 32 | 49 | 40 | 94 | 87 | 102 | 94 |
| 10 | Vanguard | 52 | 44 | 40 | .. | 36 | 42 | 43 | 13 | 92 | 87 | 102 | 94 |
| 11 | Oderbruch | 52 | 24 | 42 | 24 | 38 | 16 | 44 | 21 | 94 | 87 | 96 | 92 |
| 12 | Claude | 51 | 32 | 29 | 8 | 40 | 10 | 40 | 17 | 94 | 93 | 109 | 99 |
| 13 | Surprise | 51 | 32 | 54 | 80 | ...... | | ...... | | 95 | 93 | ... | .. |
| 14 | Success | 50 | 40 | 33 | 16 | 27 | 34 | 37 | 14 | 88 | 86 | 95 | 90 |
| 15 | Nugent | 50 | .. | 40 | .. | 41 | 12 | 43 | 36 | 92 | 92 | 97 | 94 |
| 16 | Hulless Black | 48 | 36 | 20 | 40 | 26 | 40 | 32 | 7 | 92 | 87 | 105 | 95 |
| 17 | Trooper | 47 | 4 | 57 | 24 | 38 | 32 | 47 | 36 | 93 | 87 | 110 | 97 |
| 18 | Excelsior | 46 | 32 | 40 | ... | 37 | 4 | 41 | 12 | 95 | 87 | 102 | 95 |
| 19 | Champion | 45 | 40 | 50 | 40 | 37 | 32 | 44 | 34 | 92 | 87 | 95 | 91 |

UNIFORM TEST PLOTS OF SIX-ROWED BARLEY—*Concluded.*

| Number. | Name of Variety. | Yield per Acre at the Three Experimental Farms, Season of 1900. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of Three Farms. Bush. | Average of Three Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Agassiz, B.C. Days. | Average of Three Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Rennie's Improved .. | 45 | 20 | 52 | 24 | ...... | | ...... | | 92 | 87 | ... | .. |
| 21 | Mansfield ........... | 45 | .. | 50 | .. | 33 | 40 | 42 | 45 | 93 | 93 | 102 | 96 |
| 22 | Stella ............... | 43 | 36 | 47 | 24 | 29 | 28 | 40 | 13 | 92 | 93 | 110 | 98 |
| 23 | Garfield .............. | 43 | 36 | 43 | 16 | 32 | 10 | 39 | 37 | 95 | 92 | 102 | 96 |
| 24 | Empire .............. | 43 | 36 | 36 | 32 | 28 | 16 | 36 | 12 | 93 | 93 | 102 | 96 |
| 25 | Blue Long Head ..... | 43 | 16 | 25 | .. | 37 | 44 | 35 | 20 | 91 | 93 | 102 | 95 |
| 26 | Baxter .............. | 41 | 32 | 47 | 24 | 38 | 42 | 42 | 33 | 93 | 87 | 97 | 92 |
| 27 | Phoenix ........... | 41 | 32 | 52 | 24 | 36 | 22 | 43 | 26 | 92 | 87 | 99 | 93 |
| 28 | Yale ............... | 41 | 32 | 53 | 16 | 40 | .. | 45 | .. | 98 | 92 | 109 | 100 |
| 29 | Brome ............... | 40 | 40 | 32 | 40 | 32 | 4 | 35 | 12 | 94 | 93 | 103 | 97 |

The six varieties of six-rowed barley which have given the largest crops at the three experimental farms during 1900 are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury ............... | 60 | .. | 4. Royal ...... ........... | 58 | 8 |
| 2. Pioneer ................ | 60 | .. | 5. Argyle ...... ........... | 56 | 32 |
| 3. Common .... ........... | 59 | 8 | 6. Odessa ...... ........... | 55 | .. |

An average crop of 58 bushels 8 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury ................ | 60 | .. | 4. Royal ...... ........ | 56 | 32 |
| 2. Trooper ...... ........... | 57 | 24 | 5. Surprise ................. | 54 | 80 |
| 3. Albert .... ...... ....... | 57 | 24 | 6. Yale ...... ............ | 53 | 16 |

An average crop of 56 bushels 37 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury ......... ...... | 44 | 8 | 4. Claude ........ ........ | 40 | 10 |
| 2. Nugent .. ......... ...... | 41 | 12 | 5. Yale ...... ............. | 40 | .. |
| 3. Odessa .......... ...... | 40 | 20 | 6. Petschora .... .......... | 39 | 38 |

An average crop of 40 bushels 47 lbs. per acre.

The six varieties of six-rowed barley which have given the largest crops in 1900, taking the average of the results obtained on the three experimental farms, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 54 | 35 | 4. Odessa | 49 | 1 |
| 2. Common | 50 | 22 | 5. Albert | 49 | 40 |
| 3. Royal | 49 | 2 | 6. Petschora | 48 | 39 |

An average crop of 50 bushels 15 lbs. per acre.

The average crop of all the varieties of six-rowed barley tested at the three experimental farms in 1900 was as follows: At Ottawa, 49 bushels 14 lbs. per acre; Nappan, 45 bushels 6 lbs.; and at Agassiz, 35 bushels 45 lbs. The average return given by the whole of the varieties at the three farms named was 43 bushels 22 lbs. per acre.

## TRIAL PLOTS OF SPRING WHEAT.

Forty-nine varieties of spring wheat have been grown on the uniform test plots for 1900. Among these there are thirty cross-bred sorts which have been produced at the experimental farms. These are Huron, Blenheim, Preston, Laurel, Captor, Weldon, Admiral, Crown, Stanley, Harold, Clyde, Plumper, Percy, Beauty, Crawford, Byron, Advance, Fraser, Blair, Alpha, Norval, Mason, Progress, Ebert, Vernon, Early Riga, Rideau, Dawn, Countess and Dufferin. The size of the plots in each case was one-fortieth of an acre and the quantity of seed sown was in the proportion of one and one-half bushels per acre. The dates of sowing were as follows: At Ottawa, April 28th to 30th; Nappan, May 26th, and at Agassiz, April 10th and 11th.

For reasons submitted on page 5 no returns are given in the appended table from the branch farms at Brandon and Indian Head. The plots of spring wheat at Brandon have ranged from 31 bushels 30 lbs. to 8 bushels 20 lbs. per acre. At Indian Head the returns of twenty-nine plots only out of forty-nine are available. These have varied in crop from 30 bushels 20 lbs. to 11 bushels per acre.

## UNIFORM TEST PLOTS OF SPRING WHEAT.

| Number. | Name of Variety. | Yield per Acre at the Three Experimental Farms, Season of 1900. Ottawa, Ont. Bush. | Ottawa, Ont. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Average of Three Farms. Bush. | Average of Three Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Agassiz, B.C. Days. | Average of Three Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Huron | 38 | 40 | 34 | .. | 30 | 20 | 34 | 20 | 107 | 105 | 113 | 108 |
| 2 | Wellman's Fife | 35 | 20 | 34 | .. | 26 | 30 | 31 | 57 | 108 | 107 | 121 | 112 |
| 3 | Blenheim | 34 | 40 | 31 | 20 | 24 | 10 | 30 | 3 | 107 | 105 | 114 | 109 |
| 4 | Preston | 34 | .. | 38 | 40 | 27 | 10 | 33 | 17 | 105 | 103 | 114 | 107 |
| 5 | Laurel | 33 | 40 | 44 | 40 | 21 | 10 | 33 | 10 | 109 | 105 | 124 | 113 |
| 6 | Colorado | 33 | 20 | 40 | .. | 21 | 20 | 31 | 33 | 103 | 103 | 121 | 109 |
| 7 | Captor | 32 | 40 | 28 | .. | 22 | 20 | 27 | 40 | 103 | 105 | 114 | 107 |
| 8 | Red Fern | 32 | 40 | 40 | 40 | 24 | 40 | 32 | 40 | 107 | 103 | 121 | 110 |
| 9 | White Russian | 32 | 40 | 40 | 40 | 28 | 10 | 33 | 50 | 108 | 107 | 122 | 112 |
| 10 | Weldon | 32 | 40 | 40 | 40 | 18 | 20 | 30 | 33 | 104 | 105 | 124 | 111 |
| 11 | Red Fife | 32 | .. | 36 | 40 | 29 | 30 | 32 | 43 | 110 | 105 | 120 | 112 |
| 12 | Pringle's Champlain | 32 | .. | 38 | 40 | 25 | 20 | 32 | .. | 107 | 104 | 121 | 111 |
| 13 | Admiral | 31 | 20 | 33 | 20 | 20 | 10 | 28 | 17 | 106 | 104 | 121 | 110 |
| 14 | Dion's | 31 | 20 | 36 | 40 | 23 | 30 | 30 | 30 | 107 | 105 | 120 | 111 |
| 15 | Crown | 31 | 20 | 27 | 20 | 28 | 30 | 29 | 3 | 106 | 105 | 115 | 109 |
| 16 | Roumanian | 31 | 20 | 36 | 40 | 24 | 10 | 30 | 43 | 111 | 104 | 121 | 112 |
| 17 | Stanley | 30 | 40 | 33 | 20 | 22 | 20 | 28 | 47 | 104 | 102 | 115 | 107 |
| 18 | Harold | 30 | 40 | 24 | 40 | 16 | 50 | 24 | 3 | 98 | 105 | 110 | 104 |
| 19 | Clyde | 30 | 40 | 37 | 20 | 23 | 20 | 30 | 27 | 107 | 105 | 120 | 111 |
| 20 | Plumper | 30 | 20 | 36 | .. | 25 | .. | 30 | 27 | 101 | 102 | 114 | 106 |
| 21 | Percy | 30 | .. | 37 | 20 | 23 | 10 | 30 | 10 | 105 | 104 | 121 | 110 |
| 22 | Beauty | 30 | .. | 31 | 20 | 26 | 30 | 29 | 17 | 107 | 105 | 121 | 111 |
| 23 | Crawford | 30 | .. | 28 | .. | 22 | 20 | 26 | 47 | 103 | 102 | 114 | 106 |
| 24 | Monarch | 30 | .. | 36 | 40 | 29 | 30 | 32 | 3 | 109 | 105 | 121 | 112 |
| 25 | Byron | 30 | .. | 28 | .. | 23 | 30 | 27 | 10 | 105 | 102 | 113 | 107 |
| 26 | Goose | 29 | 20 | 34 | .. | 26 | .. | 27 | 47 | 111 | 103 | 120 | 111 |
| 27 | Advance | 29 | 20 | 36 | 40 | 26 | 20 | 30 | 47 | 106 | 104 | 113 | 108 |
| 28 | Fraser | 29 | 20 | 22 | .. | 27 | 40 | 26 | 20 | 103 | 101 | 111 | 105 |
| 29 | Blair | 28 | 40 | 34 | .. | 25 | 40 | 29 | 27 | 103 | 105 | 115 | 108 |
| 30 | White Fife | 28 | .. | 42 | .. | 24 | 20 | 31 | 27 | 108 | 107 | 121 | 112 |
| 31 | Alpha | 27 | 20 | 38 | .. | 24 | 30 | 29 | 57 | 107 | 105 | 121 | 111 |
| 32 | White Connell | 27 | .. | 44 | .. | 26 | .. | 32 | 20 | 110 | 105 | 120 | 112 |
| 33 | Rio Grande | 26 | 40 | 40 | .. | 22 | 20 | 29 | 40 | 109 | 104 | 122 | 112 |
| 34 | Beaudry | 26 | 40 | 36 | .. | 20 | 30 | 27 | 43 | 106 | 105 | 121 | 111 |
| 35 | Norval | 26 | 40 | 38 | .. | 25 | 10 | 29 | 57 | 101 | 102 | 114 | 106 |
| 36 | Mason | 26 | 40 | 35 | 20 | 20 | 20 | 27 | 27 | 104 | 105 | 111 | 107 |
| 37 | Progress | 26 | 20 | 33 | 20 | 26 | .. | 28 | 33 | 107 | 105 | 122 | 111 |
| 38 | Ebert | 26 | 20 | 24 | .. | 21 | .. | 23 | 47 | 101 | 105 | 114 | 107 |
| 39 | Herisson Bearded | 26 | .. | 33 | 20 | 24 | 20 | 27 | 53 | 107 | 105 | 121 | 111 |
| 40 | Vernon | 26 | .. | 33 | 20 | 25 | 40 | 28 | 20 | 107 | 101 | 113 | 107 |
| 41 | Hungarian | 25 | 40 | 41 | 20 | 22 | 20 | 29 | 47 | 110 | 104 | 120 | 111 |
| 42 | Early Riga | 25 | 20 | 28 | .. | 20 | .. | 24 | 27 | 100 | 98 | 110 | 103 |
| 43 | White Chaff Campbell's | 25 | 20 | 34 | 40 | 17 | 10 | 25 | 43 | 104 | 105 | 122 | 110 |
| 44 | Rideau | 25 | 20 | 24 | .. | 23 | 10 | 24 | 10 | 107 | 101 | 122 | 110 |
| 45 | Dawn | 24 | 40 | 34 | .. | 22 | 30 | 27 | 3 | 105 | 103 | 121 | 110 |
| 46 | Ladoga | 24 | .. | 35 | 20 | 26 | 20 | 28 | 33 | 101 | 98 | 113 | 104 |
| 47 | Red Swedish | 22 | .. | 40 | 40 | 24 | 10 | 28 | 57 | 104 | 105 | 120 | 110 |
| 48 | Countess | 22 | .. | 20 | 40 | 23 | 20 | 33 | .. | 105 | 105 | 114 | 108 |
| 49 | Dufferin | 19 | .. | 33 | 20 | 24 | .. | 25 | 27 | 105 | 100 | 114 | 106 |

The twelve varieties of spring wheat which have given the largest crops at the three experimental farms in 1900 are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Huron | 38 | 40 | 7. Captor | 32 | 40 |
| 2. Wellman's Fife | 35 | 20 | 8. Red Fern | 32 | 40 |
| 3. Blenheim | 34 | 40 | 9. White Russian | 32 | 40 |
| 4. Preston | 34 | .. | 10. Weldon | 32 | 40 |
| 5. Laurel | 33 | 40 | 11. Red Fife | 32 | .. |
| 6. Colorado | 33 | 24 | 12. Pringle's Champlain | 32 | .. |

An average crop of 33 bushels 42 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Laurel | 44 | 40 | 7. White Russian | 40 | 40 |
| 2. White Connell | 44 | .. | 8. Red Swedish | 40 | 40 |
| 3. White Fife | 42 | .. | 9. Colorado | 40 | .. |
| 4. Hungarian | 41 | 20 | 10. Rio Grande | 40 | .. |
| 5. Red Fern | 40 | 40 | 11. Preston | 38 | 40 |
| 6. Weldon | 40 | 40 | 12. Pringle's Champlain | 38 | 40 |

An average crop of 41 bushels per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Huron | 30 | 20 | 7. Preston | 27 | 10 |
| 2. Monarch | 29 | 30 | 8. Wellman's Fife | 26 | 30 |
| 3. Red Fife | 29 | 30 | 9. Beauty | 26 | 30 |
| 4. Crown | 28 | 30 | 10. Ladoga | 26 | 20 |
| 5. White Russian | 28 | 10 | 11. Advance | 26 | 20 |
| 6. Fraser | 27 | 40 | 12. White Connell | 26 | .. |

An average crop of 27 bushels 42 lbs. per acre.

The twelve varieties of spring wheat which have given the largest crops in 1900, taking the average of the results obtained on the three experimental farms, are :—

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Huron | 34 | 20 | 7. Red Fern | 32 | 40 |
| 2. White Russian | 33 | 50 | 8. White Connell | 32 | 20 |
| 3. Preston | 33 | 17 | 9. Monarch | 32 | 3 |
| 4. Laurel | 33 | 10 | 10. Pringle's Champlain | 32 | .. |
| 5. Countess | 33 | .. | 11. Wellman's Fife | 31 | 57 |
| 6. Red Fife | 32 | 43 | 12. Colorado | 31 | 33 |

An average crop of 32 bushels 44 lbs. per acre.

The average crop of all the varieties of spring wheat tested at the three experimental farms in 1900 was as follows: At Ottawa, 29 bushels 5 lbs. per acre ; Nappan, 34 bushels 30 lbs. and at Agassiz 24 bushels. The average return given by the whole of the varieties of spring wheat at the three farms named was 29 bushels 23 lbs. per acre.

# TRIAL PLOTS OF PEASE.

Fifty-six varieties of pease have been tested in the uniform trial plots during 1900. Among these are included thirty of the cross-bred sorts which have been originated at the experimental farms. These are Fergus, Duke, Fenton, Prince, Lanark, Kent, Arthur, Dover, Bright, Nelson, Picton, Alma, Perth, Pearl, Gregory, King, Agnes, Archer, Macoun, Vincent, Trilby, Carleton, Mackay, Herald, Cooper, Bruce, Elder, Elliot, Bedford and Chelsea. These were sown in plots of one-fortieth of an acre each at Ottawa, Nappan and Agassiz, and at Brandon in plots of one-twentieth acre; the quantity of seed used per acre has varied from two to three bushels, depending on the size of the pea. The dates of sowing were as follows: At Ottawa, May 7; Nappan, May 28th; Brandon, April 23rd and at Agassiz, April 3rd.

For reasons submitted on page 5 no returns are given in the appended table for the branch farm at Indian Head. Out of fifty-seven plots sown there returns from sixteen only are available. These have ranged in yield from 33 bushels to 14 bushels per acre.

UNIFORM TEST PLOTS OF PEASE.

| Number. | Name of Variety. | Yield per Acre at the Four Experimental Farms, Season of 1900. | | | | | | | | | | Number of Days from Sowing to Harvesting | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Agassiz, B.C. | | Average of Four Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man | Agassiz, B.C. | Average of Four Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. |
| 1 | Golden Vine | 40 | .. | 13 | 20 | 33 | 20 | 19 | .. | 26 | 25 | 109 | 101 | 130 | 129 | 117 |
| 2 | Fergus | 38 | 40 | 10 | .. | 33 | 10 | 24 | 30 | 26 | 35 | 112 | 103 | 131 | 131 | 119 |
| 3 | Paragon | 36 | .. | 18 | 40 | 22 | 50 | 15 | .. | 23 | 7 | 107 | 106 | 127 | 129 | 117 |
| 4 | Early Britain | 35 | 20 | 16 | .. | 25 | 10 | 32 | 10 | 27 | 10 | 106 | 100 | 129 | 127 | 115 |
| 5 | Duke | 35 | 20 | 17 | 20 | 37 | 10 | 30 | 20 | 30 | 2 | 112 | 106 | 130 | 131 | 120 |
| 6 | Fenton | 33 | 20 | 13 | 20 | 29 | 40 | 30 | 10 | 26 | 37 | 111 | 102 | 131 | 131 | 119 |
| 7 | Mummy | 33 | 20 | 22 | .. | 30 | .. | 20 | 30 | 26 | 27 | 110 | 100 | 128 | 129 | 117 |
| 8 | Harrison's Glory | 32 | 40 | 18 | .. | 32 | 30 | 26 | .. | 27 | 17 | 105 | 101 | 130 | 129 | 116 |
| 9 | Prince | 32 | .. | 14 | .. | 41 | 40 | 27 | 20 | 28 | 45 | 112 | 101 | 130 | 127 | 117 |
| 10 | Chancellor | 31 | 40 | 22 | 40 | 31 | 30 | 24 | 40 | 27 | 37 | 103 | 102 | 129 | 133 | 117 |
| 11 | New Potter | 30 | 40 | 20 | .. | 18 | 30 | 25 | 10 | 23 | 35 | 112 | 101 | 127 | 124 | 116 |
| 12 | Lanark | 30 | 40 | 18 | .. | 30 | .. | 27 | 20 | 26 | 30 | 110 | 101 | 132 | 122 | 116 |
| 13 | Kent | 30 | 20 | 13 | 20 | 31 | .. | 19 | 40 | 23 | 35 | 110 | 101 | 131 | 133 | 119 |
| 14 | Arthur | 30 | .. | 20 | 40 | 22 | 40 | 26 | 10 | 24 | 52 | 103 | 100 | 127 | 127 | 114 |
| 15 | Oddfellow | 30 | .. | 26 | 40 | 17 | 10 | 21 | .. | 23 | 42 | 103 | 100 | 130 | 126 | 115 |
| 16 | Dover | 29 | 20 | 12 | .. | 35 | 30 | 22 | 20 | 24 | 47 | 114 | 102 | 130 | 131 | 119 |
| 17 | Prussian Blue | 28 | 40 | 10 | .. | 37 | 30 | 22 | 40 | 24 | 42 | 112 | 101 | 130 | 133 | 119 |
| 18 | Wisconsin Blue | 28 | 40 | 12 | 40 | .. | .. | 27 | 30 | 22 | 57 | 112 | 101 | .... | 129 | [illegible] |
| 19 | White Wonder | 28 | .. | 20 | 40 | 43 | .. | 29 | 10 | 30 | 12 | 103 | 100 | 130 | 133 | 116 |
| 20 | Elephant Blue | 28 | .. | 26 | 40 | 16 | 30 | 25 | 50 | 24 | 15 | 110 | 102 | 127 | 127 | 116 |
| 21 | Bright | 27 | 20 | 16 | 40 | 39 | .. | 21 | 40 | 26 | 10 | 114 | 101 | 132 | 132 | 120 |
| 22 | Lge. White Marrowfat | 27 | 20 | 10 | .. | 38 | 30 | 27 | 50 | 25 | 55 | 113 | 101 | 132 | 133 | 120 |
| 23 | Nelson | 27 | .. | 28 | 40 | 26 | .. | 19 | 10 | 25 | 12 | 105 | 101 | 128 | 128 | 115 |
| 24 | English Grey | 26 | 40 | 21 | 20 | 30 | 50 | 24 | 30 | 25 | 50 | 106 | 103 | 130 | 127 | 116 |
| 25 | Canadian Beauty | 26 | .. | 15 | 20 | 21 | 30 | 25 | 40 | 22 | 7 | 108 | 102 | 130 | 133 | 118 |
| 26 | Black-eyed Marrowfat | 26 | .. | 22 | 40 | 22 | 40 | 26 | .. | 24 | 20 | 112 | 102 | 130 | 128 | 118 |
| 27 | Picton | 26 | .. | 18 | .. | 24 | 40 | 26 | .. | 23 | 40 | 110 | 101 | 128 | 127 | 116 |
| 28 | Alma | 26 | .. | 21 | 20 | 25 | 10 | 15 | .. | 21 | 52 | 108 | 101 | 127 | 127 | 116 |

UNIFORM TEST PLOTS OF PEASE—*Concluded.*

| Number. | Name of Variety. | Yield per Acre at the Four Experimental Farms, Season of 1900. | | | | | | | | | | Number of Days from Sowing to Harvesting | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Agassiz, B.C. | | Average of Four Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Agassiz, B.C. | Average of Four Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. |
| 29 | Perth | 25 | 40 | 24 | 40 | 35 | .. | 28 | .. | 21 | 20 | 107 | 101 | 130 | 127 | 116 |
| 30 | Creeper | 25 | 20 | 15 | 20 | 31 | 20 | 15 | 40 | 21 | 55 | 108 | 102 | 130 | 127 | 117 |
| 31 | Daniel O'Rourke | 25 | 20 | 20 | 40 | 33 | 50 | 29 | 10 | 27 | 15 | 105 | 102 | 128 | 122 | 114 |
| 32 | German White | 25 | 20 | 18 | .. | 36 | 40 | 29 | .. | 27 | 15 | 105 | 101 | 131 | 129 | 116 |
| 33 | Pearl | 25 | 20 | 10 | .. | 40 | .. | 19 | 40 | 23 | 45 | 111 | 106 | 130 | 133 | 120 |
| 34 | Centennial | 25 | 20 | 23 | 20 | 31 | .. | 24 | 40 | 26 | 5 | 112 | 100 | 130 | 131 | 118 |
| 35 | Gregory | 24 | 40 | 10 | .. | 26 | 30 | 24 | 20 | 21 | 22 | 105 | 101 | 132 | 132 | 117 |
| 36 | King | 24 | .. | 16 | .. | 44 | .. | 22 | 20 | 26 | 35 | 110 | 102 | 132 | 128 | 118 |
| 37 | Pride | 24 | .. | 18 | 40 | 29 | 50 | 28 | 20 | 24 | 17 | 107 | 102 | 129 | 127 | 116 |
| 38 | Agnes | 24 | .. | 22 | .. | 38 | .. | 24 | 40 | 27 | 10 | 107 | 101 | 129 | 132 | 117 |
| 39 | Archer | 24 | .. | 21 | 20 | 39 | 30 | 25 | 50 | 27 | 40 | 112 | 102 | 130 | 131 | 119 |
| 40 | Macoun | 23 | 20 | 12 | .. | 36 | 20 | 26 | .. | 24 | 25 | 107 | 105 | 131 | 131 | 118 |
| 41 | Vincent | 23 | 20 | 15 | 20 | 31 | 20 | 23 | .. | 23 | 15 | 110 | 101 | 130 | 127 | 117 |
| 42 | Victoria | 23 | 20 | 6 | 40 | 32 | 20 | 26 | .. | 22 | 5 | 105 | 102 | 129 | 133 | 117 |
| 43 | Crown | 23 | 20 | 29 | 20 | 31 | 10 | 26 | 40 | 27 | 37 | 110 | 101 | 129 | 125 | 116 |
| 44 | Trilby | 22 | 40 | 15 | 20 | 42 | 30 | 25 | 20 | 26 | 28 | 109 | 105 | 131 | 126 | 118 |
| 45 | Carleton | 22 | .. | 21 | 20 | 42 | 40 | 23 | 20 | 27 | 20 | 111 | 102 | 130 | 127 | 117 |
| 46 | Prince Albert | 22 | .. | 12 | .. | 35 | 10 | 16 | 50 | 21 | 30 | 111 | 101 | 129 | 133 | 118 |
| 47 | Mackay | 22 | .. | 17 | 20 | 28 | 40 | 24 | .. | 23 | .. | 109 | 105 | 128 | 127 | 117 |
| 48 | Herald | 22 | .. | 10 | .. | 34 | 30 | 26 | 30 | 23 | 15 | 112 | 101 | 131 | 129 | 118 |
| 49 | Cooper | 20 | 40 | 19 | 20 | 17 | 40 | 21 | .. | 19 | 40 | 105 | 101 | 129 | 129 | 116 |
| 50 | French Canner | 20 | 40 | 22 | 40 | 12 | 40 | 27 | 20 | 20 | 50 | 103 | 102 | 126 | 127 | 114 |
| 51 | Bruce | 20 | .. | 13 | 20 | 34 | 20 | 29 | .. | 24 | 10 | 112 | 105 | 131 | 132 | 120 |
| 52 | Elder | 19 | 20 | 15 | 20 | 32 | .. | 18 | .. | 21 | 10 | 106 | 105 | 129 | 127 | 117 |
| 53 | Elliott | 19 | 20 | 22 | 40 | 38 | 30 | 23 | 30 | 26 | .. | 110 | 106 | 129 | 132 | 119 |
| 54 | Bedford | 18 | .. | 17 | 20 | 32 | 40 | 18 | 50 | 21 | 27 | 109 | 106 | 130 | 133 | 117 |
| 55 | Chelsea | 18 | .. | 11 | 20 | 39 | .. | 21 | 20 | 22 | 25 | 110 | 102 | 131 | 133 | 119 |
| 56 | Multiplier | 17 | 20 | 22 | .. | 32 | 50 | 18 | .. | 22 | 32 | 112 | 102 | 129 | 124 | 117 |

The twelve varieties of pease which have given the largest crops at the four experimental farms during 1900, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Vine | 40 | .. | 7. Mummy | 33 | 20 |
| 2. Fergus | 38 | 40 | 8. Harrison's Glory | 33 | 20 |
| 3. Paragon | 36 | .. | 9. Prince | 32 | .. |
| 4. Early Britain | 35 | 20 | 10. Chancellor | 31 | 40 |
| 5. Duke | 35 | 20 | 11. New Potter | 30 | 40 |
| 6. Fenton | 33 | 20 | 12. Lanark | 30 | 40 |

An average crop of 35 bushels 2 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N. S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 29 | 20 | 7. Chancellor | 22 | 40 |
| 2. Nelson | 28 | 40 | 8. French Canner | 22 | 40 |
| 3. Oddfellow | 26 | 40 | 9. Elliot | 22 | 40 |
| 4. Elephant Blue | 26 | 40 | 10. Black-eyed Marrowfat | 22 | 40 |
| 5. Perth | 24 | 40 | 11. Mummy | 22 | .. |
| 6. Centennial | 23 | 20 | 12. Multiplier | 22 | .. |

An average crop of 24 bushels 30 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King | 44 | .. | 7. Archer | 39 | 30 |
| 2. White Wonder | 43 | .. | 8. Bright | 39 | .. |
| 3. Carleton | 42 | 40 | 9. Chelsea | 39 | .. |
| 4. Trilby | 42 | 30 | 10. Elliot | 38 | 30 |
| 5. Prince | 41 | 40 | 11. Large White Marrowfat | 38 | 30 |
| 6. Pearl | 40 | .. | 12. Agnes | 38 | .. |

An average crop of 40 bushels 32 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Britain | 32 | 10 | 7. Bruce | 29 | .. |
| 2. Duke | 30 | 20 | 8. Pride | 28 | 20 |
| 3. Fenton | 30 | 10 | 9. Perth | 28 | .. |
| 4. Daniel O'Rourke | 29 | 10 | 10. Large White Marrowfat | 27 | 50 |
| 5. White Wonder | 29 | 10 | 11. Wisconsin Blue | 27 | 30 |
| 6. German White | 29 | .. | 12. Prince | 27 | 20 |

An average crop of 29 bushels per acre.

The twelve varieties of pease which have given the largest crops in 1900, taking the average results obtained on the four experimental farms, are the following :

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Wonder | 30 | 12 | 7. Carleton | 27 | 20 |
| 2. Duke | 30 | 2 | 8. Harrison's Glory | 27 | 17 |
| 3. Prince | 28 | 45 | 9. Daniel O'Rourke | 27 | 15 |
| 4. Archer | 27 | 40 | 10. German White | 27 | 15 |
| 5. Crown | 27 | 37 | 11. Agnes | 27 | 10 |
| 6. Chancellor | 27 | 37 | 12. Early Britain | 27 | 10 |

An average crop of 27 bushels 57 lbs. per acre.

The average crop of all the varieties of pease tested at each of the experimental farms in 1900 was as follows :—At Ottawa, 26 bushels 29 lbs. per acre ; Nappan, 17 bushels 34 lbs.; Brandon, 31 bushels 35 lbs., and at Agassiz, 24 bushels 14 lbs, The average return given by the whole of the varieties at the four farms named was 24 bushels 58 lbs. per acre.

## TRIAL PLOTS OF INDIAN CORN.

Thirty-two varieties of Indian Corn have been tested during 1900. These were planted on fairly uniform soil in rows three feet apart and the plants thinned out to six or eight inches apart in the rows. The dates of planting were as follows : At Ottawa, May 25th ; Nappan, June 7th ; Brandon, May 19th ; Indian Head, May 19th and at Agassiz, May 29th and 30th.

All the plots were cut green and put into the silo for the winter feeding of stock. The dates of cutting were : At Ottawa, September 12th ; Nappan, October 8th ; Brandon, September 3rd ; Indian Head, September 4th, and at Agassiz on October 3rd. The yield per acre has been calculated in each case from the weight obtained from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF INDIAN CORN.

| Number. | Name of Variety. | Yield at the Several Experimental Farms Season of 1900. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Per acre. Tons | Lbs | Per acre. Tons | Lbs | Per acre. Tons | Lbs | Per acre. Tons | Lbs | Per acre. Tons | Lbs | Per acre, Tons | Lbs |
| 1 | Rural Tho'bd White Flint | 24 | 1280 | 28 | 750 | 29 | 1400 | 17 | 1420 | 18 | 1180 | 23 | 1606 |
| 2 | Red Cob Ensilage........ | 23 | 1740 | 24 | 70 | 15 | 360 | 13 | 950 | 26 | 360 | 20 | 1096 |
| 3 | Early Mastodon.......... | 23 | 1300 | 23 | 1850 | 20 | 920 | 16 | 1110 | 24 | 1500 | 21 | 1736 |
| 4 | Giant Prolific Ensilage.... | 23 | 1300 | 23 | 970 | 16 | 1440 | 13 | 1720 | 21 | 570 | 19 | 1600 |
| 5 | Superior Fodder.......... | 23 | 640 | 26 | 1900 | 17 | 1640 | 14 | 260 | 26 | 800 | 21 | 1640 |
| 6 | Salzer's All Gold.......... | 23 | 310 | 20 | .... | 13 | 840 | 11 | 1100 | 20 | 1360 | 17 | 1522 |
| 7 | Champion White Pearl..... | 23 | 200 | 27 | 1550 | 15 | 800 | 15 | 1570 | 23 | 530 | 21 | 130 |
| 8 | Mammoth Cuban......... | 23 | 200 | 24 | 1500 | 14 | 1700 | 15 | 30 | 26 | 680 | 20 | 1622 |
| 9 | Longfellow.................. | 22 | 110 | 21 | 1670 | 15 | 1020 | 16 | 340 | 15 | 360 | 18 | 300 |
| 10 | Angel of Midnight........ | 22 | .... | 23 | 750 | 18 | 1620 | 18 | 190 | 17 | 760 | 19 | 1864 |
| 11 | Canada White Flint..... | 22 | .... | 22 | 550 | 18 | 1180 | 15 | 30 | 15 | 580 | 18 | 1262 |
| 12 | White Cap Yellow Dent... | 21 | 1780 | 22 | 1650 | 12 | 1520 | 12 | 640 | 17 | 320 | 17 | 782 |
| 13 | Cloud's Early Yellow..... | 21 | 900 | 25 | 600 | 15 | 1240 | 15 | 800 | 25 | 1040 | 20 | 1316 |
| 14 | Mamm. Eight-rowed Flint | 21 | 240 | 21 | 1670 | 15 | 1900 | 16 | 1110 | 18 | 1620 | 18 | 1708 |
| 15 | Pride of the North........ | 21 | 20 | 24 | 950 | 15 | 1900 | 12 | 1410 | 26 | 360 | 20 | 128 |
| 16 | Selected Leaming......... | 20 | 40 | 23 | 420 | 16 | 120 | 14 | 1260 | 16 | 670 | 18 | 102 |
| 17 | North Dakota White...... | 20 | 40 | 24 | 950 | 22 | 1100 | 14 | 260 | 15 | 800 | 19 | 630 |
| 18 | Compton's Early ......... | 19 | 500 | 18 | 1950 | 20 | 700 | 16 | 340 | 15 | 360 | 17 | 1970 |
| 19 | Early Butler.............. | 19 | 280 | 23 | 1850 | 15 | 1240 | 14 | 490 | 17 | 320 | 18 | 36 |
| 20 | Pearce's Prolific ......... | 18 | 1400 | 20 | 1800 | 22 | 220 | 13 | 950 | 18 | 630 | 18 | 1400 |
| 21 | King of the Earliest...... | 18 | 850 | 23 | 970 | 19 | 500 | 13 | 180 | 21 | 1580 | 19 | 416 |
| 22 | Sanford ...... ............ | 17 | 1970 | 20 | 1550 | 19 | 1160 | 13 | 720 | 15 | 690 | 17 | 818 |
| 23 | Evergreen Sugar.......... | 17 | 1200 | 22 | 1100 | 12 | 420 | 14 | 1260 | 18 | 960 | 17 | 188 |
| 24 | Extra Early Huron....... | 17 | 1000 | 19 | 500 | 12 | 1520 | 10 | 20 | 24 | 1720 | 16 | 1752 |
| 25 | Kendall's Early Giant.... | 15 | 1900 | 19 | 1600 | 16 | 120 | 11 | 1870 | 16 | 10 | 15 | 1900 |
| 26 | Early Yellow Long Eared. | 13 | 1280 | ....... | | 22 | 220 | 18 | 960 | 21 | 680 | ....... | |
| 27 | Country Gentleman ...... | 12 | 1520 | 22 | 550 | 11 | 1100 | 11 | 1870 | 19 | 280 | 15 | 1064 |
| 28 | Mitchell's Extra Early.... | 12 | 310 | 13 | 1950 | 20 | 480 | 12 | 1410 | 11 | 1210 | 15 | 192 |
| 29 | Yellow Six-weeks Extra.. | 11 | 110 | 11 | 1870 | 10 | 900 | 9 | 480 | 17 | 760 | 12 | 24 |
| 30 | Extra Early Szekely...... | 10 | 1780 | 13 | 1950 | 11 | 1100 | 9 | 480 | 13 | 1280 | 11 | 1718 |
| 31 | North Dakota Yellow..... | 10 | 1780 | 11 | .... | 17 | 100 | 13 | 181 | 14 | 1480 | 13 | 708 |
| 32 | Salzer's Earliest Ripe..... | 9 | 1800 | 9 | 700 | 8 | 500 | 9 | 480 | 14 | 1810 | 10 | 658 |

The six varieties of Indian corn which have given the heaviest crops at the several experimental farms during 1900 are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint.. | 24 | 1280 | 4. Giant Prolific Ensilage.. | 23 | 1300 |
| 2. Red Cob Ensilage....... | 23 | 1740 | 5. Superior Fodder ........ | 23 | 640 |
| 3. Early Mastodon ........ | 23 | 1300 | 6. Salzer's All Gold........ | 23 | 310 |

An average crop of 23 tons 1,428 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint.. | 28 | 750 | 4. Cloud's Early Yellow.... | 25 | 600 |
| 2. Champion White Pearl.. | 27 | 1550 | 5. Mammoth Cuban........ | 24 | 1500 |
| 3. Superior Fodder ........ | 26 | 1900 | 6. North Dakota White.... | 24 | 950 |

An average crop of 26 tons 542 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint.. | 29 | 1400 | 4. Early Yellow Long Eared | 22 | 220 |
| 2. North Dakota White .... | 22 | 1100 | 5. Early Mastodon......... | 20 | 920 |
| 3. Pearce's Prolific ........ | 22 | 220 | 6. Compton's Early........ | 20 | 700 |

An average crop of 22 tons 1,760 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Early Yellow Long Eared | 18 | 960 | 4. Early Mastodon......... | 16 | 1110 |
| 2. Angel of Midnight...... | 18 | 190 | 5. Mammoth 8-rowed Flint. | 16 | 1110 |
| 3. Thoro'bred White Flint .. | 17 | 1420 | 6. Compton's Early........ | 16 | 340 |

An average crop of 17 tons 525 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Superior Fodder........ | 26 | 800 | 4. Red Cob Ensilage....... | 26 | 360 |
| 2. Mammoth Cuban........ | 26 | 680 | 5. Cloud's Early Yellow.... | 25 | 1040 |
| 3. Pride of the North ...... | 26 | 360 | 6. Extra Early Huron...... | 24 | 1720 |

An average crop of 25 tons 1,827 lbs. per acre.

The six varieties of Indian corn which have given the heaviest crops in 1900, taking the average of the results obtained on all the experimental farms, are as follows :

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint.. | 23 | 1606 | 4. Champion White Pearl.. | 21 | 130 |
| 2. Early Mastodon......... | 21 | 1736 | 5. Mammoth Cuban ....... | 20 | 1622 |
| 3. Superior Fodder ........ | 21 | 1640 | 6. Cloud's Early Yellow.... | 20 | 1316 |

An average crop of 21 tons 1,341 lbs. per acre.

The average weight, cut green, of all the varieties of Indian corn tested at each of the experimental farms in 1900 was as follows : At Ottawa, 18 tons 1,868 lbs. per acre ; Nappan, 21 tons 649 lbs.; Brandon, 16 tons 1,406 lbs.; Indian Head, 13 tons 1,746 lbs., and at Agassiz, 19 tons 414 lbs. The average return given by the whole of the varieties at all the farms was 18 tons 17 lbs. per acre.

## TRIAL PLOTS OF TURNIPS.

Twenty-eight varieties of turnips were tested during 1900 sown on drills or on the flat 2½ feet apart. Two sowings were made at each farm, the second about two weeks later than the first. The dates of sowing in each case will be found in the accompanying table ; the dates on which the roots were pulled were as follows : At Ottawa, October 16th ; Nappan, November 1st ; Brandon, October 29th ; Indian Head, October 8th, and at Agassiz, October 23rd. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 10 | Sown May 22 | Sown May 29 | Sown June 12 | Sown May 19 | Sown June 2 | Sown May 18 | Sown May 25 | Sown May 18 | Sown June 1 | First Sowing | Second Sowing |
| | | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. |
| 1 | Carter's Elephant........ | 42 1800 | 25 1150 | 42 480 | 21 1725 | 10 64 | 8 1160 | 19 310 | 6 1740 | 17 1200 | 16 560 | 26 771 | 15 1667 |
| 2 | Skirvings................ | 37 1240 | 31 865 | 42 1800 | 26 1625 | 8 1160 | 15 1680 | 16 400 | 15 780 | 16 560 | 18 80 | 24 632 | 21 1006 |
| 3 | Champion Purple Top.... | 36 1590 | 26 925 | 33 .... | 24 675 | 12 1080 | 10 1384 | 19 1675 | 8 1040 | 24 1280 | 26 1680 | 25 725 | 19 740 |
| 4 | West Norfolk Red Top... | 36 930 | 29 1400 | 33 1980 | 28 925 | 7 1048 | 12 1608 | 14 290 | 11 1040 | 28 1200 | 22 ... | 24 289 | 20 1794 |
| 5 | Sutton's Champion....... | 36 105 | 34 1300 | 30 .... | 29 575 | 8 1160 | 11 440 | 13 670 | 16 400 | 17 1080 | 15 1240 | 21 203 | 21 791 |
| 6 | Monarch ............... | 35 1940 | 18 795 | 42 480 | 23 1850 | 6 1200 | 8 1160 | 14 1235 | 9 990 | 17 1970 | 16 120 | 23 965 | 15 1199 |
| 7 | Magnum Bonum......... | 35 1289 | 30 1710 | 34 1300 | 29 1400 | 10 856 | 9 1800 | 8 1850 | 10 1825 | 15 1680 | 19 280 | 21 195 | 20 203 |
| 8 | Drummond Purple Top... | 35 620 | 24 1830 | 38 1880 | 26 1625 | 9 216 | 10 328 | 20 545 | 8 1580 | 20 1580 | 19 1600 | 24 1768 | 18 192 |
| 9 | Perfection Swede ........ | 33 825 | 28 925 | 35 950 | 25 1975 | 10 1120 | 12 1872 | 20 410 | 15 1590 | 36 160 | 31 920 | 27 293 | 22 1856 |
| 10 | Shamrock Purple Top.... | 33 825 | 31 37 | 37 745 | 23 1850 | 8 104 | 14 1040 | 14 1505 | 11 1040 | 19 280 | 15 800 | 22 1091 | 19 553 |
| 11 | Kangaroo................ | 33 330 | 29 575 | 40 850 | 26 1150 | 9 480 | 10 1120 | 10 70 | 7 415 | 17 1860 | 13 400 | 22 318 | 17 732 |
| 12 | Elephant's Master........ | 32 1835 | 30 1050 | 37 250 | 26 1625 | 7 520 | 9 480 | 11 905 | 13 130 | 26 800 | 22 220 | 23 62 | 20 701 |
| 13 | Selected Purple Top...... | 32 1340 | 28 760 | 33 .... | 30 1050 | 7 1048 | 11 704 | 15 1590 | 15 240 | 24 1280 | 18 80 | 22 1451 | 20 1366 |
| 14 | Hall's Westbury ......... | 32 1010 | 23 530 | 38 1550 | 27 450 | 5 1088 | 15 1680 | 17 80 | 12 990 | 18 80 | 20 700 | 22 761 | 19 1670 |
| 15 | Selected Champion....... | 32 680 | 30 1050 | 40 1675 | 25 325 | 9 1800 | 15 360 | 15 1995 | 15 1590 | 17 320 | 16 560 | 23 494 | 20 1177 |
| 16 | East Lothian ............ | 32 350 | 21 240 | 37 1075 | 28 1750 | 8 368 | 13 136 | 19 1000 | 14 560 | 16 1000 | 11 1760 | 22 1559 | 17 1689 |
| 17 | Hartley's Bronze......... | 31 1360 | 24 1170 | 42 975 | 25 1975 | 9 1800 | 13 400 | 17 350 | 10 235 | 19 1160 | 19 620 | 24 329 | 18 1280 |
| 18 | Mammoth Clyde......... | 31 1195 | 26 1790 | 36 600 | 21 1725 | 6 936 | 11 440 | 17 1700 | 13 400 | 25 1920 | 25 1040 | 23 1270 | 19 1479 |
| 19 | Marquis of Lorne......... | 31 1030 | 26 965 | 31 1525 | 18 1455 | 6 1992 | 11 440 | 15 240 | 14 560 | 16 780 | 16 1660 | 20 713 | 17 1016 |
| 20 | New Arctic .............. | 31 1030 | 24 180 | 34 1300 | 22 1375 | 7 1576 | 9 480 | 12 315 | 8 350 | 18 520 | 16 1880 | 20 1748 | 16 453 |
| 21 | Jumbo.................... | 31 370 | 27 1935 | 33 1650 | 22 1375 | 5 1880 | 19 800 | 8 1175 | 12 1395 | 17 320 | 15 1680 | 19 679 | 19 1437 |
| 22 | Imperial Swede.......... | 30 390 | 26 1130 | 42 1305 | 29 1400 | 9 480 | 13 400 | 11 770 | 22 385 | 25 1920 | 22 1020 | 23 1773 | 22 1667 |
| 23 | Pearce's Prize Winner.... | 29 80 | 22 1375 | 37 1900 | 26 1625 | 8 1160 | 12 1080 | 14 1505 | 9 525 | 19 1380 | 19 620 | 22 5 | 18 245 |
| 24 | Prize Purple Top......... | 28 1750 | 23 860 | 37 250 | 26 800 | 9 1800 | 12 1344 | 15 375 | 13 1480 | 18 80 | 16 560 | 21 1651 | 18 1009 |
| 25 | Halewood's Bronze Top... | 28 100 | 14 1370 | 37 1075 | 28 100 | 4 1240 | 11 1760 | 19 1675 | 14 20 | 18 1400 | 14 1040 | 21 1498 | 16 1258 |
| 26 | Bangholm Selected....... | 27 1440 | 24 510 | 35 125 | 23 1025 | 5 560 | 14 1040 | 17 1565 | 12 315 | 26 1680 | 25 820 | 22 1074 | 19 1942 |
| 27 | Giant King .............. | 24 180 | 21 900 | 30 225 | 18 1950 | 10 1120 | 8 1160 | 16 1665 | 9 1485 | 17 1860 | 15 360 | 19 1810 | 14 1571 |
| 28 | Webb's New Renown..... | all rotted | all rotted | 27 1275 | 26 1625 | 10 1120 | 15 360 | 19 310 | 20 1625 | 15 1680 | 11 1980 | 18 569 | 18 596 |

The crops from the two sowings of turnips at the experimental farms in 1900 have averaged per acre as follows:

| | | Tons. | Lbs. |
|---|---|---|---|
| Central Experimental Farm, | first sowing | 32 | 1542 |
| " " | second sowing | 26 | 420 |
| Experimental Farm, Nappan, | first sowing | 36 | 1258 |
| " " " | second sowing | 25 | 1322 |
| " " Brandon, | first sowing | 8 | 82 |
| " " " | second sowing | 12 | 523 |
| " " Indian Head, | first sowing | 15 | 1220 |
| " " " | second sowing | 12 | 1240 |
| " " Agassiz, | first sowing | 20 | 1104 |
| " " " | second sowing | 18 | 1296 |

Average crop from all the plots at all the farms, first sowing, 22 tons 1,441 lbs.; second sowing, 19 tons 160 lbs. per acre.

The six varieties of turnips which have given the heaviest crops at the several experimental farms during the season of 1900 are the following. (Where not otherwise stated the quantities given are all from the early sown plots.):

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Carter's Elephant | 42 | 1800 | 4. West Norfolk Red Top | 36 | 930 |
| 2. Skirvings | 37 | 1240 | 5. Sutton's Champion | 36 | 105 |
| 3. Champion Purple Top | 36 | 1590 | 6. Monarch | 35 | 1940 |

An average crop of 37 tons 1,267 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Skirvings | 42 | 1800 | 4. Monarch | 42 | 480 |
| 2. Imperial Swede | 42 | 1305 | 5. Carter's Elephant | 42 | 480 |
| 3. Hartley's Bronze | 42 | 975 | 6. Selected Champion | 40 | 1675 |

An average crop of 42 tons 715 lbs per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON. MAN.

| | Per Acre. Tons | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Jumbo, 2nd sowing | 19 | 800 | 5. Webb's N. Renown, 2nd s. | 15 | 360 |
| 2. Skirvings, 2nd sowing | 15 | 1680 | 6. Shamrock Purple Top, 2nd sowing | 14 | 1040 |
| 3. Hall's Westbury, 2nd sow. | 15 | 1680 | | | |
| 4. Sel'd Champion, 2nd sow. | 15 | 360 | | | |

An average crop of 15 tons 1,987 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Imp. Swede, 2nd sowing. | 22 | 385 | 4. Perfection Swede | 20 | 410 |
| 2. Webb's N. Renown, 2nd s | 20 | 1625 | 5. Champion Purple Top | 19 | 1675 |
| 3. Drummond Purple Top | 20 | 545 | 6. Halewood's Bronze Top. | 19 | 1675 |

An average crop of 20 tons 1,052 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Perfection Swede | 36 | 160 | 4. Shamrock Purple Top, 2nd sowing | 26 | 1680 |
| 2. West Norfolk Red Top | 28 | 1200 | 5. Carter's Elephant | 26 | 800 |
| 3. Bangholm Selected- | 26 | 1680 | 6. Mammoth Clyde | 25 | 1920 |

An average crop of 28 tons 907 lbs. per acre.

The six varieties of turnips which have produced the heaviest crops in 1900, taking the average of the results obtained on all the experimental farms are the following :

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Carter's Elephant....... | 28 | 291 | 4. Drummond Purple Top.. | 24 | 1768 |
| 2. Perfection Swede ....... | 27 | 293 | 5. Skirvings............... | 24 | 632 |
| 3. Champion Purple Top... | 25 | 723 | 6. Hartley's Bronze........ | 24 | 329 |

An average crop of 25 tons 1,339 lbs. per acre.

The early sown plots have again given the larger crops at four of the experimental farms. The average results from all the farms show (Brandon being the exception) a difference of 3 tons 1,280 lbs. per acre in favor of the early sowings.

## TRIAL PLOTS OF MANGELS.

Twenty-two varieties of mangels have been under test during 1900, all sown on drills or on the flat in rows 2½ feet apart. Two sowings were made at each of the experimental farms, the second sowing two weeks later than the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following : At Ottawa, October 16th ; Nappan, October 24th ; Brandon, October 2nd ; Indian Head, September 28th and at Agassiz October 24th. The yield per acre has been calculated in each case from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety | Ottawa, Ont. Sown May 16 | Ottawa, Ont. Sown May 30 | Nappan, N.S. Sown May 29 | Nappan, N.S. Sown June 12 | Brandon, Man. Sown May 19 | Brandon, Man. Sown June 2 | Indian Head, N.W.T. Sown May 18 | Indian Head, N.W.T. Sown May 25 | Agassiz, B.C. Sown April 25 | Agassiz, B.C. Sown May 12 | Average of all Farms. First Sowing | Average of all Farms. Second Sowing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Canadian Giant.......... | 51 630 | 34 310 | 37 250 | 28 1750 | 10 328 | 13 1720 | 24 1590 | 11 740 | 18 740 | 20 1580 | 28 708 | 21 1620 |
| 2 | Giant Yellow Intermediate | 49 340 | 24 1500 | 49 175 | 30 1875 | 12 552 | 11 440 | 20 1370 | 16 370 | 28 1960 | 21 1120 | 32 79 | 20 1861 |
| 3 | Ward's Large Oval Shaped | 47 1040 | 33 1650 | 33 1650 | 24 1500 | 9 744 | 13 928 | 12 795 | 15 1500 | 13 1720 | 11 1760 | 23 790 | 19 1868 |
| 4 | Mammoth Long Red..... | 46 400 | 39 540 | 41 1325 | 30 1875 | 13 928 | 13 136 | 19 640 | 21 1980 | 14 1040 | 12 640 | 27 67 | 23 1034 |
| 5 | Giant Yellow Half Long.. | 45 1080 | 25 1150 | 47 875 | 28 100 | 10 1648 | 11 1232 | 19 1465 | 12 1200 | 26 800 | 19 1380 | 29 1973 | 19 1012 |
| 6 | Mam. Yellow Intermediate | 44 440 | 38 560 | 47 875 | 33 825 | 11 704 | ....... | 16 335 | 13 715 | 18 1620 | 22 880 | 27 1195 | 26 1745 |
| 7 | Gate Post............... | 42 480 | 34 1300 | 40 25 | 30 225 | 10 1384 | 15 888 | 23 1670 | 18 1950 | 16 120 | 14 600 | 26 1136 | 22 1393 |
| 8 | Half Long Sugar Rosy.... | 42 295 | 28 430 | 30 1875 | 22 1375 | 10 1384 | 11 704 | 12 1740 | 15 1500 | 22 1760 | 18 80 | 23 1811 | 19 418 |
| 9 | Yellow Intermediate.... | 42 150 | 40 1510 | 43 625 | 25 1150 | 5 32 | 13 664 | 12 1080 | 18 570 | 14 1920 | 14 1040 | 23 761 | 22 987 |
| 10 | Champion Yellow Globe.. | 42 150 | 35 290 | 41 1325 | 30 1875 | 10 1384 | 12 288 | 26 740 | 13 820 | 20 480 | 11 880 | 28 416 | 20 1231 |
| 11 | Half Long Sugar White.. | 41 1820 | 31 700 | 27 1275 | 26 1025 | 7 1840 | 12 1608 | 13 1270 | 15 1920 | 16 560 | 12 640 | 22 953 | 19 1579 |
| 12 | Prize Mamm. Long Red.. | 41 1490 | 33 990 | 40 1675 | 25 1150 | 11 1760 | 13 400 | 18 860 | 18 1815 | 14 1040 | 17 200 | 25 965 | 21 1311 |
| 13 | Gate Post Yellow........ | 41 500 | 29 1400 | 33 1650 | 25 655 | 10 328 | 8 1680 | 18 30 | 11 1160 | 14 820 | 13 180 | 23 1066 | 17 1415 |
| 14 | Lion Yellow Intermediate | 41 500 | 40 1180 | 50 1805 | 32 1175 | 11 704 | 8 1688 | 10 1090 | 17 1490 | 11 880 | 14 160 | 25 196 | 22 1539 |
| 15 | Giant Yellow Globe...... | 41 170 | 27 450 | 43 625 | 39 375 | 12 816 | 12 1608 | 20 5 | 13 160 | 10 240 | 11 440 | 25 771 | 20 1407 |
| 16 | Sutton's Yellow Globe.... | 41 170 | 37 580 | 51 1125 | 33 650 | 8 1952 | 11 1760 | not sown | not sown | 15 800 | 14 1920 | 29 512 | 24 727 |
| 17 | Mammoth Oval Shaped... | 39 210 | 41 500 | 34 475 | 28 1750 | 14 1832 | 15 1416 | 16 1840 | 16 1330 | 13 1720 | 11 1760 | 23 1615 | 22 1751 |
| 18 | Norbiton Giant......... | 37 910 | 31 1360 | 39 375 | 31 1525 | 12 552 | 12 816 | 17 935 | 19 910 | 18 960 | 15 1460 | 24 1946 | 22 414 |
| 19 | Selected Mam. Long Red. | 37 250 | 30 1050 | 40 25 | 28 100 | 13 664 | 21 240 | 16 1330 | 23 590 | 13 1720 | 15 360 | 24 398 | 23 1268 |
| 20 | Golden Fleshed Tankard. | 36 1590 | 31 1855 | 35 950 | 26 305 | 8 1954 | 7 1312 | 12 1620 | 12 660 | 15 800 | 14 820 | 21 1782 | 18 990 |
| 21 | Yellow Fleshed Tankard.. | 31 865 | 30 60 | 41 5 | 28 1255 | 8 1688 | 8 896 | 7 520 | 12 795 | 18 80 | 13 400 | 21 632 | 18 1081 |
| 22 | Warden Orange Globe.. | 31 370 | 30 60 | 32 175 | 28 925 | 11 176 | 8 632 | 13 505 | 16 370 | 9 1580 | 10 1340 | 19 961 | 18 1465 |

The crops from the two sowings of mangels at the experimental farms in 1900 have averaged per acre as follows:—

| | | |
|---|---|---|
| Central Experimental Farm, first sowing.......... | 41 tons | 1175 lbs. |
| " " second sowing....... | 33 " | 337 " |
| Experimental Farm, Nappan, first sowing........ | 40 " | 234 " |
| " " " second sowing....... | 29 " | 247 " |
| " " Brandon, first sowing........ | 10 " | 1516 " |
| " " " second sowing..... | 12 " | 536 " |
| Experimental Farm, Indian Head, first sowing..... | 16 tons | 1687 lbs. |
| " " second sowing.. | 15 " | 1930 " |
| " Agassiz, first sowing.......... | 16 " | 1334 " |
| " " second sowing........ | 15 " | 76 " |

Average crop from all the plots at all the farms, first sowing, 25 tons 69 lbs.; second sowing, 21 tons 225 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops at the several experimental farms during 1900, are the following. (Unless otherwise stated, the yields given are all from the earliest sown plots.):

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Canadian Giant | 51 | 630 |
| 2. Giant Yellow Intermediate | 49 | 340 |
| 3. Ward's Large Oval Shaped | 47 | 1040 |
| 4. Mammoth Long Red | 46 | 400 |
| 5. Giant Yellow Half Long | 45 | 1050 |
| 6. Mam. Yellow Intermediate | 44 | 440 |

An average crop of 47 tons 650 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Sutton's Yellow Globe | 51 | 1125 |
| 2. Lion Yellow Intermediate | 50 | 1805 |
| 3. Giant Yellow Intermediate | 49 | 175 |
| 4. Mam Yellow Intermediate | 47 | 875 |
| 5. Giant Yellow Globe | 43 | 625 |
| 6. Yellow Intermediate | 43 | 625 |

An average crop of 47 tons 1,205 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Selected Mammoth Long Red (2nd sowing) | 21 | 240 |
| 2. Red Fleshed Tankard (2nd sowing) | 17 | 1904 |
| 3. Mammoth Oval Shaped (2nd sowing) | 15 | 1416 |
| 4. Gate Post (2nd sowing) | 15 | 888 |
| 5. Canadian Giant (2nd sowing) | 13 | 1720 |
| 6. Mammoth Long Red | 13 | 928 |

An average crop of 16 tons 516 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Champion Yellow Globe | 26 | 740 |
| 2. Canadian Giant | 24 | 1590 |
| 3. Gate Post | 23 | 1670 |
| 4. Selected Mammoth Long Red (2nd sowing) | 23 | 590 |
| 5. Mammoth Long Red (2nd sowing) | 21 | 1980 |
| 6. Giant Yellow Intermediate | 20 | 1370 |

An average crop of 23 tons 990 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Giant Yellow Intermediate | 28 | 1960 |
| 2. Giant Yellow Half Long | 26 | 800 |
| 3. Half Long Sugar Rosy | 22 | 1760 |
| 4. Mammoth Yellow Intermediate (2nd sowing) | 22 | 880 |
| 5. Canadian Giant (2nd sowing) | 20 | 1580 |
| 6. Champion Yellow Globe | 20 | 480 |

An average crop of 23 tons 1,243 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops in 1900, taking the average of the results obtained on all the experimental farms, are:

| | Per Acre. Tons. | Lbs. |
|---|---|---|
| 1. Giant Yellow Intermediate | 32 | 79 |
| 2. Giant Yellow Half Long | 29 | 1973 |
| 3. Sutton's Yellow Globe | 29 | 512 |
| 4. Canadian Giant | 28 | 708 |
| 5. Champion Yellow Globe | 28 | 416 |
| 6. Mammoth Yellow Intermediate | 27 | 1195 |

An average crop of 29 tons 480 lbs. per acre.

The early sown plots of mangels have given in 1900 larger crops than those later sown at all the experimental farms, excepting that at Brandon, the average of all, showing an advantage in favour of early sowing of 3 tons 844 lbs. per acre.

## TRIAL PLOTS OF CARROTS.

Nineteen varieties of carrots were under test during 1900, all sown on drills or on the flat, in rows two feet apart. Two sowings were made in each case, the second sowing two weeks later than the first. For reasons submitted on page 5 no returns are given in the appended table from the branch farm at Indian Head, and the results of the second sowing only at Brandon.

The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following : At Ottawa, October 16th ; Nappan, November 2nd ; Brandon, October 4th, and at Agassiz, October 23rd. The yield per acre in each case has been calculated from the weight of roots gathered from two rows each 66 feet long.

## UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | Agassiz, B.C. | | | | Average of four Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 16 | | Sown May 30 | | Sown May 29 | | Sown June 12 | | Sown June 2 | | Sown April 24 | | Sown May 11 | | First Sowing | | Second Sowing | |
| | | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. | Per acre, Tons. | Lbs. |
| 1 | Giant White Vosges | 38 | 1880 | 27 | 1770 | 25 | 325 | 15 | 195 | 5 | 1000 | 36 | 160 | 31 | 920 | 33 | 788 | 20 | 410 |
| 2 | New White Intermediate | 37 | 250 | 31 | 1810 | 23 | 1025 | 17 | 650 | 4 | 1240 | 31 | 480 | 24 | 400 | 30 | 1251 | 19 | 1025 |
| 3 | Improved Short White | 35 | 1280 | 27 | 120 | 21 | 75 | 17 | 155 | 4 | 1240 | 35 | 400 | 29 | 740 | 30 | 1251 | 19 | 1064 |
| 4 | Half Long White | 33 | 1155 | 27 | 1275 | 30 | 1875 | 15 | 195 | 5 | 560 | 33 | .... | 27 | 120 | 32 | 1010 | 18 | 1537 |
| 5 | Iverson's Champion | 32 | 1340 | 26 | 1130 | 19 | 280 | 14 | 875 | 4 | 360 | 25 | 160 | 18 | 960 | 25 | 1260 | 15 | 1831 |
| 6 | Green Top White Orthe | 32 | 515 | 26 | 470 | 26 | 1955 | 12 | 255 | 5 | 1880 | 26 | 800 | 25 | 1480 | 28 | 1090 | 17 | 1021 |
| 7 | White Vosges Large Short | 31 | 700 | 25 | 1150 | 21 | 405 | 10 | 955 | 2 | 1280 | 23 | 420 | 21 | 1560 | 25 | 508 | 15 | 236 |
| 8 | Guerande or Ox-Heart | 27 | 615 | 23 | 1190 | 19 | 775 | 13 | 895 | 5 | 560 | 26 | 800 | 23 | 420 | 24 | 730 | 16 | 766 |
| 9 | Yellow Intermediate | 26 | 1460 | 24 | 1170 | 17 | 650 | 13 | 400 | 3 | 1480 | 20 | 1360 | 16 | 780 | 21 | 1157 | 14 | 957 |
| 10 | Ontario Champion | 26 | 800 | 24 | 15 | 25 | 325 | 12 | 255 | 3 | 160 | 30 | 1660 | 35 | 400 | 27 | 928 | 18 | 1207 |
| 11 | Mamm. White Intermediate | 26 | 140 | 22 | 550 | 29 | 80 | 16 | 505 | 3 | 600 | 27 | 120 | 20 | 1580 | 27 | 780 | 15 | 1309 |
| 12 | Carter's Orange Giant | 25 | 1810 | 21 | 1560 | 17 | 25 | 10 | 1450 | 4 | 1240 | 27 | 1440 | 23 | 1300 | 23 | 1092 | 15 | 387 |
| 13 | Half Long Chantenay | 25 | 985 | 24 | 1170 | 17 | 1475 | 15 | 1680 | 5 | 1000 | 20 | 1580 | 23 | 1960 | 21 | 680 | 17 | 952 |
| 14 | Early Gem | 25 | 820 | 22 | 550 | 22 | 1705 | 15 | 855 | 5 | 1000 | 28 | 1200 | 23 | 1520 | 25 | 1242 | 16 | 1481 |
| 15 | White Belgian | 22 | 880 | 21 | 570 | 18 | 1455 | 12 | 1575 | 3 | 1040 | 25 | 600 | 23 | 640 | 22 | 312 | 15 | 456 |
| 16 | Scarlet Intermediate | 19 | 1270 | 15 | 1185 | 14 | 1205 | 9 | 150 | 3 | 160 | 17 | 1200 | 12 | 640 | 17 | 558 | 10 | 34 |
| 17 | Scarlet Nantes | 17 | 1805 | 15 | 690 | 14 | 875 | 9 | 975 | 2 | 1720 | 13 | 400 | 11 | 880 | 15 | 360 | 9 | 1566 |
| 18 | Long Orange or Surrey | 17 | 1805 | 14 | 50 | 17 | 320 | 9 | 1305 | 2 | 1720 | 13 | 400 | 11 | 660 | 16 | 175 | 9 | 934 |
| 19 | Scarlet Altringham | 17 | 650 | 12 | 1080 | 19 | 1600 | 9 | 1305 | 3 | 600 | 16 | 560 | 19 | 1380 | 17 | 1603 | 11 | 591 |

The crops from the two sowings of Carrots at the Experimental Farms in 1900 have averaged as follows:—

Central Experimental Farm, first sowing........... 27 tons 745 lbs.
" " " second sowing........ 22 " 1763 "
Experimental Farm, Nappan, first sowing........... 21 " 233 "
" " " second sowing........ 13 " 244 "
" " Brandon, second sowing only.... 4 " 360 "

Experimental Farm Agassiz, first sowing.......... 25 tons 302 lbs.
" " " second sowing...... 22 " 544 "

Average crop from all the plots at the four farms, omitting the second sowing at Brandon, was: first sowing 24 tons 1093 lbs; second sowing, 19 tons 850 lbs., an advantage in favor of the early sown plots of 5 tons 243 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops at the four experimental farms during 1900 are the following. (Unless otherwise stated the yields given are all from the earliest sown plots):

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ON

| | Per Acre. Tons. | Per Acre. Lbs. |
|---|---|---|
| 1. Giant White Vosges.... | 38 | 1880 |
| 2. New White Intermediate .... .......... | 37 | 250 |
| 3. Improved Short White. | 35 | 1280 |
| 4. Half Long White...... | 33 | 1155 |
| 5. Iverson's Champion...... | 32 | 1340 |
| 6. Green Top White Orthe | 32 | 515 |

An average crop of 35 tons 70 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Per Acre. Lbs. |
|---|---|---|
| Half Long White...... | 30 | 1875 |
| 2. Mamm. White Intermediate................ | 29 | 80 |
| 3. Green Top White Orthe | 26 | 1955 |
| 4. Giant White Vosges.... | 25 | 325 |
| 5. Ontario Champion..... | 25 | 325 |
| 6. New White Intermediate................. | 23 | 1025 |

An average crop of 26 tons 1,597 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BBANDON, MAN.

| | Per Acre. Tons. | Per Acre. Lbs. |
|---|---|---|
| From second sowing only. | | |
| 1. Green Top White Orthe. | 5 | 1880 |
| 2. Half Long Chantenay... | 5 | 1000 |
| 3. Giant White Vosges..... | 5 | 1000 |
| 4. Early Gem ............. | 5 | 1000 |
| 5. Half Long White....... | 5 | 560 |
| 6. Guerande or Ox-heart.... | 5 | 560 |

An average crop of 5 tons 1,000 lbs per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Per Acre. Lbs. |
|---|---|---|
| 1 Giant White Vosges.... | 36 | 160 |
| 2. Improved Short White. | 35 | 400 |
| 3. Ontario Champion, 2nd sowing.............. | 35 | 400 |
| 4. Half Long White...... | 33 | |
| 5. New White Intermediate.................. | 31 | 480 |
| 6. Early Gem............ | 28 | 1200 |

An average crop of 33 tons 440 lbs per acre.

The six varieties of carrots which have produced tne heaviest crops in 1900, taking the average of the results obtained on the four experimental farms named, are the following:—

| | Per Acre. Tons. | Per Acre. Lbs. |
|---|---|---|
| 1. Giant White Vosges.... | 33 | 788 |
| 2. Half Long White...... | 32 | 1010 |
| 3. Improved Short White. | 30 | 1251 |
| 4. New White Intermediate.................. | 30 | 1251 |
| 5. Green Top White Orthe | 28 | 1090 |
| 6. Ontario Champion..... | 27 | 928 |

An average crop of 30 tons 1,053 lbs. per acre.

## TRIAL PLOTS OF SUGAR BEETS.

Six varieties of sugar beets have been tested during 1900, sown on drills or on the flat two feet apart. Two sowings were made in each case, the second sowing about two weeks later than the first. For reasons submitted on page 5 no returns are given in the appended table from the branch farm at Agassiz.

The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were the following: At Ottawa, October 16th; Nappan, October 24th; Brandon, October 4th and at Indian Head September 28th. The yield per acre in each instance has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF SUGAR BEETS.

| Number. | Name of Variety. | Ottawa, Ont. | | | | Nappan, N.S. | | | | Brandon, Man. | | | | Indian Head, N.W.T. | | | | Average of Four Farms. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 16. | | Sown May 30. | | Sown May 29. | | Sown. June 12. | | Sown May 19. | | Sown June 2 | | Sown May 18. | | Sown May 25 | | First Sowing. | | Second Sowing | |
| | | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. | Per Acre. Tons | Lbs. |
| 1 | Danish Improved | 42 | 810 | 28 | 430 | 25 | 325 | 20 | 425 | 8 | 632 | 10 | 1384 | 10 | 970 | 10 | 10 | 21 | 1184 | 17 | 562 |
| 2 | Wanzleben | 40 | 355 | 31 | 1030 | 28 | 1225 | 19 | 1005 | 9 | 744 | 13 | 400 | 11 | 740 | 12 | 1740 | 22 | 766 | 19 | 544 |
| 3 | Improved Imperial | 38 | 1335 | 25 | 490 | 37 | 1075 | 23 | 1355 | 10 | 328 | 13 | 136 | 11 | 1295 | 9 | 1860 | 24 | 1008 | 17 | 1960 |
| 4 | Red Top Sugar | 37 | 580 | 26 | 1130 | 35 | 125 | 23 | 200 | 10 | 592 | 11 | 1232 | 12 | 930 | 15 | 1125 | 23 | 1557 | 19 | 422 |
| 5 | Danish Red Top | 34 | 805 | 31 | 1030 | 30 | 1875 | 25 | 325 | 10 | 64 | 14 | 1040 | 11 | 50 | 12 | 1620 | 21 | 1198 | 21 | 4 |
| 6 | Vilmorin's Improved | 27 | 615 | 22 | 220 | 22 | 1375 | 21 | 1725 | 8 | 368 | 8 | 632 | 10 | 1090 | 11 | 1970 | 17 | 362 | 16 | 137 |

The crops from the two sowings of Sugar Beets at the Experimental Farms in 1900, omitting that at Agassiz, B.C., have averaged as follows:

| | Tons | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing | 36 | 1417 |
| " " " second sowing | 27 | 1055 |
| Experimental Farm, Nappan, first sowing | 30 | .... |
| " " " second sowing | 22 | 506 |
| Experimental Farm, Brandon, first sowing | 9 | 788 |
| " " " second sowing | 11 | 1804 |
| Experimental Farm, Indian Head, first sowing | 11 | 513 |
| " " " second sowing | 12 | 388 |

Average crop from all the farms, excepting Agassiz: first sowing, 21 tons 1679 lbs; second sowing, 18 tons 938 lbs per acre, showing an advantage in favour of early sowing of 3 tons 741 lbs per acre.

The four varieties of sugar beets which have produced the heaviest crops at the four experimental farms in 1900 are the following:—

(Unless otherwise stated the yields given are all from the earliest sown plots).

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved | 42 | 810 | 3. Improved Imperial | 38 | 1335 |
| 2. Wanzleben | 40 | 355 | 4. Red Top Sugar | 37 | 580 |

An average crop of 39 tons 1,270 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial | 37 | 1075 | 3. Danish Red Top | 30 | 1875 |
| 2. Red Top Sugar | 35 | 125 | 4. Wanzleben | 28 | 1225 |

An average crop of 33 tons 75 lbs. per acre

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top (2nd sowing) | 14 | 1040 | 3. Improved Imperial (2nd sowing) | 13 | 136 |
| 2. Wanzleben (2nd sowing) | 13 | 400 | 4. Red Top Sugar (2nd sowing) | 11 | 1232 |

An average crop of 13 tons 202 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar (2nd sowing) | 15 | 1125 | 3. Danish Red Top (2nd sowing) | 12 | 1620 |
| 2. Wanzleben (2nd sowing) | 12 | 1740 | 4. Vilmorin's Improved (2nd sowing) | 11 | 1970 |

An average crop of 13 tons 614 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops in 1900, taking the average of the results obtained at all the experimental farms excepting Agassiz, are the following:—

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial | 24 | 1008 | 3. Wanzleben | 22 | 766 |
| 2. Red Top Sugar | 23 | 1557 | 4. Danish Red Top | 21 | 1198 |

An average crop of 23 tons 132 lbs. per acre.

The early sown plots of sugar beets have given larger crops than those later sown at the experimental farms at Ottawa and Nappan, while those later sown at Brandon and Indian Head have given in most instances the larger crops. The average results however from all the farms show a difference in the crops of 1900 of 3 tons 741 lbs. per acre in favour of the early sowings.

## TRIAL PLOTS OF POTATOES.

Eighty-two varieties of potatoes have been under trial in uniform test plots during 1900. The potatoes for planting were cut into pieces with two or three eyes in each and these were planted in rows 2½ feet apart, the sets being placed a foot apart in the rows. The following were the dates of planting: At Ottawa, planted on May 22nd and 23rd, dug October 9th to 11th; Nappan, planted June 6th, dug October 16th; Brandon, planted May 23rd, dug September 20th; Indian Head, planted May 14th, dug Sept. 29th, and at Agassiz, planted May 17th and 18th and dug October 1st to 4th.

UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Yield at the several Experimental Farms Season of 1900. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N. W. T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Per acre. | | Per acre. | | Per acre. | | Per acre, | | Per acre. | | Per acre. | |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| 1 | Vanier | 576 | 24 | 484 | .. | 253 | .. | 452 | .. | 212 | 18 | 395 | 32 |
| 2 | Early Sunrise | 532 | 24 | 259 | 36 | 187 | .. | 422 | 30 | 157 | 27 | 311 | 47 |
| 3 | Irish Cobbler | 532 | 24 | 536 | 48 | 300 | 40 | 465 | .. | 156 | 54 | 398 | 21 |
| 4 | Rose No. 9 | 528 | .. | 435 | 36 | 282 | 20 | 474 | 45 | 235 | 24 | 391 | 13 |
| 5 | Burnaby Seedling | 525 | 48 | 477 | 24 | 275 | .. | 495 | 30 | 142 | .. | 383 | 8 |
| 6 | Northern Spy | 525 | 48 | 492 | 48 | 304 | 20 | 465 | .. | 237 | 36 | 405 | 6 |
| 7 | Flemish Beauty Seedling | 525 | 48 | 444 | 24 | 201 | 40 | 348 | 30 | 143 | 45 | 332 | 49 |
| 8 | Empire State | 519 | 12 | 451 | .. | 216 | 20 | 607 | 15 | 136 | .. | 385 | 57 |
| 9 | Money Maker | 517 | .. | 396 | .. | 311 | 40 | 283 | .. | 151 | 10 | 331 | 46 |
| 10 | General Gordon | 517 | .. | 376 | 22 | 165 | .. | 522 | 45 | 145 | .. | 3-5 | 13 |
| 11 | Polaris | 502 | 42 | 272 | 48 | 198 | .. | 470 | 15 | 169 | 24 | 322 | 38 |
| 12 | Late Puritan | 492 | 48 | 330 | .. | 249 | 20 | 472 | 45 | 150 | .. | 338 | 58 |
| 13 | American Wonder | 488 | 24 | 473 | .. | 242 | .. | 662 | .. | 169 | 24 | 406 | 57 |
| 14 | Seattle | 490 | 36 | 495 | .. | 348 | 20 | 607 | 15 | 211 | 12 | 430 | 28 |
| 15 | Rural No. 2 | 488 | 24 | 308 | .. | 220 | .. | 397 | 30 | 150 | 30 | 312 | 53 |
| 16 | Swiss Snow-Flake | 486 | 12 | 431 | 12 | 198 | .. | 308 | 15 | 197 | 17 | 324 | 11 |
| 17 | State of Maine | 481 | 48 | 347 | 36 | 293 | 20 | 570 | 45 | 154 | .. | 369 | 30 |
| 18 | Vick's Extra Early | 481 | 48 | 396 | .. | 216 | 20 | 556 | 30 | 150 | 15 | 360 | 11 |
| 19 | Sharpe's Seedling | 475 | 12 | 490 | .. | 146 | 40 | 468 | 15 | 168 | 18 | 349 | 41 |
| 20 | New Queen | 475 | 12 | 435 | 36 | 212 | 40 | 462 | 15 | 130 | .. | 343 | 8 |
| 21 | Rochester Rose | 470 | 48 | 420 | 12 | 150 | 20 | 722 | .. | 153 | .. | 383 | 16 |
| 22 | American Giant | 464 | 12 | 444 | 24 | 183 | 20 | 656 | .. | 140 | .. | 377 | 35 |
| 23 | Seedling No. 230 | 464 | 12 | 451 | .. | 311 | 40 | 417 | 45 | 292 | 36 | 387 | 27 |
| 24 | Early Norther | 462 | .. | 448 | 48 | 168 | 40 | 294 | 30 | 150 | 15 | 304 | 50 |
| 25 | Early Market | 462 | .. | 444 | 24 | 256 | 40 | 379 | .. | 280 | 30 | 364 | 31 |
| 26 | Rural Blush | 459 | 48 | 462 | .. | 304 | 20 | 501 | 15 | 232 | 16 | 391 | 56 |
| 27 | Dreer's Standard | 457 | 36 | 451 | .. | 260 | 20 | 418 | .. | 152 | 30 | 347 | 53 |
| 28 | Maule's Thoroughbred | 457 | 36 | 407 | .. | 242 | .. | 431 | 15 | 155 | .. | 338 | 34 |
| 29 | Reeve's Rose | 455 | 24 | 378 | 34 | 282 | 20 | 485 | .. | 148 | 30 | 349 | 58 |
| 30 | Brown's Rot Proof | 455 | 24 | 402 | 36 | 271 | 20 | 396 | .. | 153 | 12 | 335 | 42 |
| 31 | I. X. L | 451 | .. | 402 | 36 | 238 | 20 | 552 | 30 | 138 | 30 | 356 | 35 |
| 32 | Penn Manor | 446 | 36 | 226 | 36 | 256 | 40 | 511 | 15 | 167 | 12 | 321 | 40 |
| 33 | Columbus | 446 | 36 | 462 | .. | 286 | .. | 541 | .. | 141 | 30 | 375 | 25 |
| 34 | Holborn Abundance | 442 | 12 | 605 | .. | 286 | .. | 459 | 15 | 141 | .. | 386 | 41 |
| 35 | Clay Rose | 440 | .. | 477 | 24 | 201 | 40 | 358 | 15 | 198 | .. | 335 | 4 |
| 36 | Lee's Favourite | 437 | 48 | 367 | 24 | 234 | 40 | 481 | .. | 162 | 48 | 336 | 44 |

UNIFORM TEST PLOTS OF POTATOES.—*Concluded.*

| Number. | Name of Variety. | YIELD AT THE SEVERAL EXPERIMENTAL FARMS SEASON OF 1900. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man | | Indian Head, N. W. T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre, Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. |
| 37 | Troy Seedling...... | 437 | 48 | 448 | .. | 337 | 20 | 507 | .. | 171 | 36 | 374 | 21 |
| 38 | Country Gentleman. | 435 | 36 | 363 | .. | 190 | 40 | 495 | 30 | 165 | .. | 329 | 57 |
| 39 | Uncle Sam......... | 435 | 36 | 413 | 36 | 300 | 40 | 579 | 45 | 232 | 16 | 392 | 22 |
| 40 | Early Six Weeks... | 424 | 36 | 473 | .. | 293 | 20 | 488 | 30 | 171 | 36 | 370 | 12 |
| 41 | Carman No. 3....... | 424 | 36 | 396 | .. | 308 | .. | 478 | 45 | 156 | 12 | 352 | 42 |
| 42 | Early Harvest...... | 422 | 24 | 418 | .. | 297 | .. | 440 | 45 | 174 | 54 | 350 | 36 |
| 43 | Wonder of the World | 420 | 12 | .... | .. | 165 | .. | 408 | 45 | 142 | .. | 283 | 59 |
| 44 | Cambridge Russet.. | 420 | 12 | 448 | 48 | 293 | 20 | 417 | 45 | 152 | .. | 346 | 25 |
| 45 | Thorburn........... | 420 | 12 | 422 | 24 | 172 | 20 | 440 | 45 | 150 | 30 | 321 | 14 |
| 46 | Green Mountain.... | 420 | 12 | 396 | .. | 293 | 20 | 342 | 30 | 180 | 24 | 326 | 29 |
| 47 | Burpee's ExtraEarly | 418 | .. | 418 | .. | 201 | 40 | 388 | .. | 138 | .. | 312 | 44 |
| 48 | Early Rose......... | 415 | 48 | 360 | 48 | 220 | .. | 372 | 15 | 158 | 24 | 305 | 27 |
| 49 | Sir Walter Raleigh.. | 404 | 48 | 440 | .. | 256 | 40 | 308 | 15 | 143 | 45 | 310 | 41 |
| 50 | Everett............ | 402 | 36 | 506 | .. | 231 | .. | 550 | 45 | 173 | 48 | 372 | 50 |
| 51 | Early Puritan...... | 400 | 24 | 484 | .. | 238 | 20 | 408 | 45 | 169 | 24 | 340 | 11 |
| 52 | Delaware.......... | 400 | 24 | 424 | 36 | 363 | .. | 570 | 45 | 152 | .. | 382 | 9 |
| 53 | Great Divide....... | 400 | 24 | 435 | 36 | 286 | .. | 344 | 45 | 173 | 48 | 328 | 6 |
| 54 | Dakota Red........ | 400 | 24 | 451 | .. | 374 | .. | 436 | .. | 232 | 16 | 378 | 44 |
| 55 | Daisy.............. | 391 | 36 | 385 | .. | 238 | 20 | 397 | 30 | 140 | .. | 310 | 29 |
| 56 | Lizzie's Pride....... | 389 | 24 | 330 | .. | 311 | 40 | 452 | .. | 292 | 36 | 355 | 8 |
| 57 | Bovee.............. | 385 | .. | 466 | 24 | 201 | 40 | 508 | 30 | 180 | 24 | 348 | 23 |
| 58 | Early White Prize.. | 385 | .. | 360 | 48 | 253 | .. | 369 | 45 | 127 | .. | 299 | 7 |
| 59 | McIntyre.......... | 380 | 36 | 360 | 48 | 146 | 40 | 217 | .. | 212 | 8 | 263 | 26 |
| 60 | Carman No. 1...... | 380 | 36 | 475 | 12 | 348 | 20 | 559 | 15 | 184 | 48 | 389 | 38 |
| 61 | Pearce's Extra Early | 378 | 24 | 352 | .. | 183 | 20 | 331 | .. | 153 | .. | 279 | 33 |
| 62 | Irish Daisy......... | 374 | .. | 589 | 36 | 304 | 20 | 573 | .. | 173 | 48 | 402 | 57 |
| 63 | New Variety No. 1.. | 374 | .. | 424 | 36 | 344 | 40 | 561 | 30 | 131 | 20 | 367 | 13 |
| 64 | White Beauty...... | 374 | ... | 468 | 36 | 231 | .. | 461 | 30 | 148 | 30 | 336 | 43 |
| 65 | Quaker City........ | 374 | .. | 437 | 48 | 256 | 40 | 388 | .. | 245 | 18 | 240 | 21 |
| 66 | Chicago Market.... | 369 | 36 | 334 | 24 | 209 | .. | 462 | 15 | 145 | 30 | 304 | 9 |
| 67 | Pearce's Prize Winner........... | 367 | 24 | 501 | 36 | 198 | .. | 545 | 30 | 142 | 30 | 351 | .. |
| 68 | Early Ohio......... | 363 | .. | 385 | .. | 168 | 40 | 312 | 45 | 143 | .. | 274 | 29 |
| 69 | Prize Taker........ | 356 | 24 | 413 | 36 | 253 | .. | 502 | 30 | 157 | 27 | 336 | 35 |
| 70 | Beauty of Hebron... | 347 | 36 | 433 | 24 | 238 | 20 | 598 | 15 | 142 | .. | 351 | 55 |
| 71 | Maggie Murphy.... | 334 | 24 | 422 | 24 | 201 | 40 | 410 | 45 | 127 | .. | 299 | 14 |
| 72 | Clarke's No. 1...... | 321 | 12 | 418 | .. | 308 | .. | 418 | .. | 158 | .. | 324 | 38 |
| 73 | Earliest of All...... | 319 | .. | 354 | 12 | 249 | 20 | 408 | 45 | 141 | 45 | 294 | 36 |
| 74 | Seedling No. 7...... | 318 | .. | 466 | 24 | 330 | .. | 481 | .. | 165 | .. | 352 | 5 |
| 75 | Early Michigan .... | 300 | 12 | 330 | .. | 267 | 40 | 312 | 45 | ... | .. | 302 | 39 |
| 76 | Hale's Champion... | 290 | 34 | 451 | .. | 293 | 20 | 408 | 45 | 268 | 24 | 342 | 24 |
| 77 | Houlton Rose..... | 272 | 48 | 334 | 24 | 293 | 20 | 424 | 30 | 184 | 48 | 301 | 58 |
| 78 | Brownell's Winner.. | 266 | 12 | 325 | 36 | 333 | 40 | 513 | 30 | 211 | 12 | 330 | 2 |
| 79 | Reading Giant..... | 244 | 12 | 330 | .. | 238 | 20 | 354 | 45 | 297 | .. | 292 | 51 |
| 80 | Ohio Junior........ | 237 | 36 | 462 | .. | 223 | 40 | 348 | 30 | 155 | .. | 285 | 21 |
| 81 | Bill Nye........... | 217 | 48 | 477 | 24 | 161 | 20 | 433 | 45 | 153 | 27 | 288 | 45 |
| 82 | Pride of the Market. | 209 | .. | 455 | 24 | 264 | .. | 460 | 30 | 223 | 53 | 322 | 33 |

The twelve varieties of potatoes which have produced the largest crops at the several experimental farms in 1900, are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Vanier | 576 | 24 | 7. Flemish Beauty Seedling | 525 | 48 |
| 2. Early Sunrise | 532 | 24 | 8. Empire State | 519 | 12 |
| 3. Irish Cobbler | 532 | 24 | 9. Money Maker | 517 | |
| 4. Rose No. 9 | 528 | | 10. General Gordon | 517 | |
| 5. Burnaby Seedling | 525 | 48 | 11. Polaris | 502 | 42 |
| 6. Northern Spy | 525 | 48 | 12. Late Puritan | 492 | 48 |

An average crop of 524 bushels 34 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Holborn Abundance | 605 | | 7. Northern Spy | 492 | 48 |
| 2. Irish Daisy | 589 | 36 | 8. Sharpe's Seedling | 490 | |
| 3. Irish Cobbler | 536 | 48 | 9. Vanier | 484 | |
| 4. Everett | 506 | | 10. Farly Puritan | 484 | |
| 5. Pearce's Prize Winner | 501 | 36 | 11. Bill Nye | 477 | 24 |
| 6. Seattle | 495 | | 12. Burnaby Seedling | 477 | 24 |

An average crop of 511 bushels 38 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Dakota Red | 374 | | 7. Brownell's Winner | 333 | 40 |
| 2. Delaware | 363 | | 8. Seedling No. 7 | 330 | |
| 3. Seattle | 348 | 20 | 9. Lizzie's Pride | 311 | 40 |
| 4. Carman No. 1 | 348 | 20 | 10. Money Maker | 311 | 40 |
| 5. New Variety No. 1 | 344 | 40 | 11. Seedling No. 230 | 311 | 40 |
| 6. Troy Seedling | 337 | 20 | 12. Carman No. 3 | 308 | |

An average crop of 325 bushels 12 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rochester Rose | 722 | | 7. Uncle Sam | 579 | 45 |
| 2. American Wonder | 662 | | 8. Irish Daisy | 573 | |
| 3. American Giant | 656 | | 9. State of Maine | 570 | 45 |
| 4. Empire State | 607 | 15 | 10. Delaware | 570 | 45 |
| 5. Seattle | 607 | 15 | 11. New Variety No. 1 | 561 | 30 |
| 6. Beauty of Hebron | 598 | 15 | 12. Carman No. 1 | 559 | 15 |

An average crop of 605 bushels 35 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Reading Giant | 297 | | 7. Northern Spy | 237 | 36 |
| 2. Seedling No. 230 | 292 | 36 | 8. Rose No. 9 | 235 | 24 |
| 3. Lizzie's Pride | 292 | 36 | 9. Uncle Sam | 232 | 16 |
| 4. Early Market | 280 | 30 | 10. Dakota Red | 232 | 16 |
| 5. Hale's Champion | 268 | 24 | 11. Rural Blush | 232 | 16 |
| 6. Quaker City | 245 | 18 | 12. Pride of the Market | 223 | 53 |

An average crop of 255 bushels 50 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops in 1900, taking the average of the results obtained at all the experimental farms, are the following :

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Seattle | 430 | 28 | 7. Uncle Sam | 392 | 22 |
| 2. American Wonder | 406 | 57 | 8. Rural Blush | 391 | 56 |
| 3. Northern Spy | 405 | 6 | 9. Rose No. 9 | 391 | 13 |
| 4. Irish Daisy | 402 | 57 | 10. Carman No 1 | 389 | 38 |
| 5. Irish Cobbler | 398 | 21 | 11. Seedling No. 230 | 387 | 27 |
| 6. Vanier | 395 | 32 | 12. Holborn Abundance | 386 | 41 |

An average crop of 398 bushels 13 lbs. per acre

The average crop of all the varieties of potatoes tested at each of the experimental farms was as follows: At Ottawa, 415 bushels 23 lbs. per acre ; Nappan, 414 bushels 37 lbs.; Brandon, 251 bushels 34 lbs.; Indian Head, 455 bushels 1 lb., and at Agassiz, 170 bushels 57 lbs. the average return given by the whole of the varieties at all the farms was 341 bushels 30 lbs. per acre.

# AVERAGE OF CROPS FOR THE PAST FIVE AND SIX YEARS.

The results of experiments with varieties of grain to ascertain their relative productiveness become much more reliable and conclusive when the average experience of a series of years can be given. In this way slight variations arising from inequality of soil and variability of season are, to a large extent equalized, and the conclusions reached become a much more valuable guide to the farmer in his selection of seed. The longer the experiments are continued the more accurate are the indications given. The experiences here recorded with most of the more important cereals now cover a period of five or six years.

## FIVE AND SIX YEARS' EXPERIENCE WITH VARIETIES OF OATS.

The twelve varieties of oats which have averaged the heaviest crops at the several experimental farms during the past five and six years, are the following :

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner | 68 | 25 | 7. Golden Beauty | 63 | 7 |
| 2. Golden Giant | 66 | 11 | 8. Oderbruch | 63 | 3 |
| 3. American Triumph | 65 | 27 | 9. Improved Ligowo | 63 | 1 |
| 4. Holstein Prolific | 65 | 20 | 10. Bavarian | 62 | 3 |
| 5. Joanette | 64 | 12 | 11. Columbus | 62 | 1 |
| 6. American Beauty | 63 | 31 | 12. Hazlett's Seizure | 61 | 26 |

An average crop of 64 bushels 5 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Wallis | 75 | 7 | 7. Golden Beauty | 69 | 24 |
| 2. White Russian | 72 | 22 | 8. Wide Awake | 69 | 21 |
| 3. Oderbruch | 71 | 9 | 9. White Schonen | 68 | 15 |
| 4. Lincoln | 70 | 30 | 10. Abyssinia | 68 | 8 |
| 5. Early Blossom | 70 | 17 | 11. Pense | 68 | 8 |
| 6. Banner | 70 | .. | 12. Cream Egyptian | 68 | 8 |

An average crop of 70 bushels 8 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN

Average for five years.

For reasons given on page 5 the crops of oats for 1900 are not included.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. American Beauty | 99 | 9 | 7. White Schonen | 83 | 4 |
| 2. Banner | 94 | 6 | 8. Golden Beauty | 82 | 26 |
| 3. Bavarian | 93 | 25 | 9. American Triumph | 81 | 11 |
| 4. Early Golden Prolific | 88 | 22 | 10. Abundance | 78 | 4 |
| 5. Golden Giant | 85 | 25 | 11. California Prolific Blk | 77 | 30 |
| 6. Holstein Prolific | 83 | 26 | 12. Columbus | 77 | .. |

An average crop of 85 bushels 15 lbs, per acre.

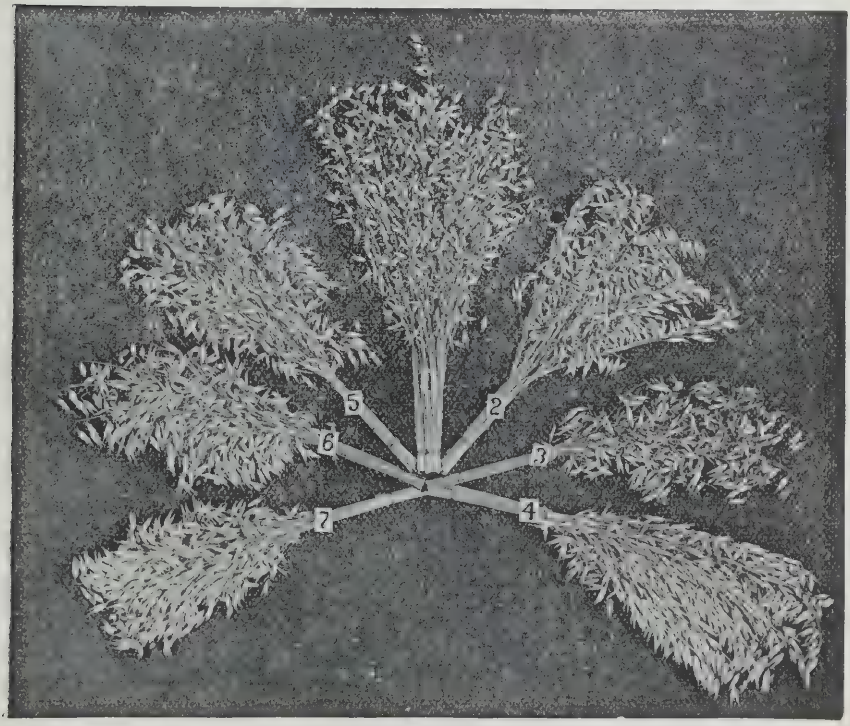
EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

Average for five years.

For reasons given on page 5 the crops of oats for 1900 are not included.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Columbus | 88 | 20 | 7. Bavarian | 81 | 22 |
| 2. Holstein Prolific | 87 | 8 | 8. White Schonen | 81 | 17 |
| 3. American Beauty | 86 | 31 | 9. Early Golden Prolific | 81 | 16 |
| 4. Abundance | 85 | 4 | 10. Early Archangel | 80 | 32 |
| 5. Golden Beauty | 83 | 24 | 11. American Triumph | 80 | 30 |
| 6. Wide Awake | 82 | .. | 12. Banner | 80 | 27 |

An average crop of 83 bushels 13 lbs. per acre.




Champion Oats—some of the heaviest average yielders in six years' trial. No. 1, Banner; 2, Oderbruch; 3, Columbus; 4, White Schonen; 5, Holstein Prolific; 6, American Beauty; 7, Golden Giant.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

Average for six years.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Giant | 67 | 15 | 7. Columbus | 57 | 30 |
| 2. Banner | 63 | 15 | 8. Buckbee's Illinois | 57 | 22 |
| 3. Lincoln | 59 | 29 | 9. Prolific Blk Tartarian | 57 | 9 |
| 4. Early Blossom | 59 | 22 | 10. Holstein Prolific | 57 | 4 |
| 5. Bavarian | 58 | 33 | 11. Abyssinia | 56 | 31 |
| 6. Early Gothland | 58 | 15 | 12. American Beauty | 56 | 30 |

An average crop of 59 bushels 10 lbs. per acre.

The twelve varieties of oats which have produced the largest average crops for the past five or six years on all the experimental farms, and hence may, perhaps, be regarded as worthy of being placed at the head of the list for general cultivation, are the following :

| | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|
| 1. Banner | 75 | 15 |
| 2. American Beauty | 74 | 31 |
| 3. Bavarian | 71 | 31 |
| 4. Golden Giant | 71 | 19 |
| 5. Holstein Prolific | 71 | 19 |
| 6. Buckbee's Illinois | 70 | 28 |
| 7. Columbus | 70 | 15 |
| 8. Golden Beauty | 69 | 30 |
| 9. Early Golden Prolific | 69 | 28 |
| 10. White Schonen | 68 | 13 |
| 11. Oderbruch | 68 | 5 |
| 12. Wallis | 68 | 2 |

An average crop of 70 bushels 31 lbs. per acre.

## FIVE AND SIX YEARS' EXPERIENCE WITH VARIETIES OF BARLEY.

### TWO-ROWED BARLEY.

The six varieties of two-rowed barley which have averaged the heaviest crops at the several experimental farms during the past five and six years are the following :

#### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

Average for six years.

| | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|
| 1. Beaver | 45 | 17 |
| 2. Canadian Thorpe | 44 | 18 |
| 3 French Chevalier | 43 | 23 |
| 4. Sidney | 42 | 17 |
| 5. Bolton | 42 | .. |
| 6. Victor | 41 | 14 |

An average crop of 43 bushels 7 lbs. per acre.

#### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

Average for six years.

| | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|
| 1. Beaver | 42 | 41 |
| 2. Danish Chevalier | 42 | 21 |
| 3. French Chevalier | 41 | 25 |
| 4. Nepean | 40 | 20 |
| 5. Newton | 40 | 20 |
| 6. Canadian Thorpe | 40 | 13 |

An average crop of 41 bushels 15 lbs. per acre.

#### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

Average for five years.

For reasons given on page 5, the crops of two-rowed barley at Brandon for 1900 are not included.

| | Per Acre. Bush. | Per Acre. Lbs. |
|---|---|---|
| 1. French Chevalier | 51 | 4 |
| 2. Sidney | 49 | 30 |
| 3. Nepean | 47 | 24 |
| 4. Newton | 47 | 12 |
| 5. Bolton | 47 | 4 |
| 6. Victor | 45 | 10 |

An average crop of 47 bushels 46 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

Average for five years.

For reasons given on page 5, the crops of two-rowed barley at Indian Head for 1900 are not included.

| | Per Acre. Bush. | Lbs. | | Per Acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier ....... | 60 | 12 | 4. Prize Prolific............ | 54 | 14 |
| 2. Danish Chevalier........ | 58 | 24 | 5. Beaver ................ | 52 | 36 |
| 3. Canadian Thorpe ....... | 55 | 21 | 6. Sidney ................. | 52 | 32 |

An average crop of 55 bushels 31 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Thorpe......... | 36 | 12 | 4. Kinver Chevalier......... | 34 | 44 |
| 2. French Chevalier ........ | 35 | 47 | 5. Beaver ................... | 34 | 20 |
| 3. Danish Chevalier......... | 35 | 40 | 6. Prize Prolific............. | 33 | 3 |

An average crop of 35 bushels 4 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest crops for the past five and six years, taking the average of the results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier ........ | 45 | 45 | 4. Canadian Thorpe......... | 43 | 30 |
| 2. Danish Chevalier ........ | 44 | 14 | 5. Newton .................. | 42 | 6 |
| 3. Beaver................... | 44 | 2 | 6. Sidney .................. | 41 | 38 |

An average crop of 43 bushels 30 lbs. per acre.

SIX-ROWED BARLEY.

The six varieties of six-rowed barley which have averaged the heaviest crops at the several experimental farms for the past five and six years, are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa ................. | 55 | 16 | 4. Pioneer ................. | 53 | 1 |
| 2. Mensury ................ | 54 | 30 | 5. Oderbruch............... | 48 | 36 |
| 3. Royal .................. | 53 | 18 | 6. Common................. | 48 | 23 |

An average crop of 52 bushels 13 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury................. | 51 | 45 | 4. Odessa .................. | 43 | 13 |
| 2. Trooper ................. | 44 | 31 | 5. Oderbruch............... | 42 | 44 |
| 3. Surprise................. | 44 | 13 | 6. Stella.................... | 42 | 21 |

An average crop of 44 bushels 44 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

Average for five years.

For reasons given on page 5 the crops of six-rowed barley at Brandon for 1900 are not included.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Trooper | 57 | 9 | 4. Nugent | 53 | 30 |
| 2. Common | 56 | 4 | 5. Summit | 52 | 26 |
| 3. Mensury | 55 | 8 | 6. Surprise | 51 | 46 |

An average crop of 54 bushels 20 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH WEST TERRITORIES, INDIAN HEAD, N.W.T.

Average for five years.

For reasons given on page 5 the crops of six-rowed barley at Indian Head for 1900 are not included.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rennie's Improved | 62 | 10 | 4. Trooper | 58 | 16 |
| 2. Odessa | 59 | 44 | 5. Common | 57 | 35 |
| 3. Mensury | 58 | 20 | 6. Baxter | 57 | 30 |

An average crop of 58 bushels 9 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 35 | 37 | 4. Odessa | 34 | 1 |
| 2. Oderbruch | 35 | 29 | 5. Common | 33 | 12 |
| 3. Baxter | 35 | 2 | 6. Royal | 33 | 29 |

An average crop of 34 bushels 26 lbs. per acre.

The six varieties of six-rowed barley which have produced the largest crops for the past five and six years, taking the average of the results obtained on all the experimental farms, are:

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 51 | 9 | 4. Common | 46 | 46 |
| 2. Trooper | 48 | 10 | 5. Royal | 46 | 23 |
| 3. Odessa | 48 | .. | 6. Oderbruch | 46 | 2 |

An average crop of 47 bushels 39 lbs. per acre.

## FIVE AND SIX YEARS EXPERIENCE WITH VARIETIES OF SPRING WHEAT.

The twelve varieties of spring wheat which have averaged the heaviest crops at the several experimental farms during the past five and six years, are the following:

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston | 28 | 30 | 7. Rio Grande | 25 | 2 |
| 2. Wellman's Fife | 27 | 11 | 8. Goose | 24 | 51 |
| 3. Colorado | 26 | 15 | 9. Hungarian | 24 | 49 |
| 4. Huron | 25 | 18 | 10. Stanley | 24 | 30 |
| 5. Monarch | 25 | 6 | 11. Percy | 23 | 16 |
| 6. Pringle's Champlain | 25 | 3 | 12. Red Fern | 23 | 11 |

An average crop of 25 bushels 15 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Monarch | 35 | 4 | 7. Hungarian | 32 | 52 |
| 2. Wellman's Fife | 35 | 2 | 8. White Russian | 32 | 50 |
| 3. White Connell | 34 | 50 | 9. Rio Grande | 32 | 40 |
| 4. Preston | 33 | 10 | 10. Red Fern | 32 | 10 |
| 5. Huron | 33 | 6 | 11. Advance | 31 | 43 |
| 6. Goose | 32 | 53 | 12. Stanley | 31 | 43 |

An average crop of 33 bushels 10 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

Average for five years.

For reasons given on page 5 the crops of spring wheat at Brandon for 1900 are not included.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Goose | 40 | 34 | 7. Pringle's Champlain | 35 | 58 |
| 2. White Fife | 39 | 4 | 8. White Connell | 35 | 40 |
| 3. Crown | 37 | 30 | 9. Rio Grande | 35 | 30 |
| 4. Red Fife | 37 | 10 | 10. White Russian | 34 | 22 |
| 5. Monarch | 37 | 4 | 11. Wellman's Fife | 33 | 58 |
| 6. Preston | 36 | 37 | 12. Advance | 33 | 46 |

An average crop of 36 bushels 26 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

Average for five years.

For reasons given on page 5 the crops of spring wheat at Indian Head for 1900 are not included.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Fife | 41 | 38 | 7. White Fife | 39 | 34 |
| 2. Wellman's Fife | 40 | 24 | 8. Beaudry | 39 | 30 |
| 3. Huron | 40 | 6 | 9. Percy | 39 | 22 |
| 4. Red Fern | 39 | 50 | 10. Crown | 38 | 46 |
| 5. Preston | 39 | 48 | 11. Alpha | 38 | 36 |
| 6. Emporium | 39 | 38 | 12. Monarch | 38 | 2 |

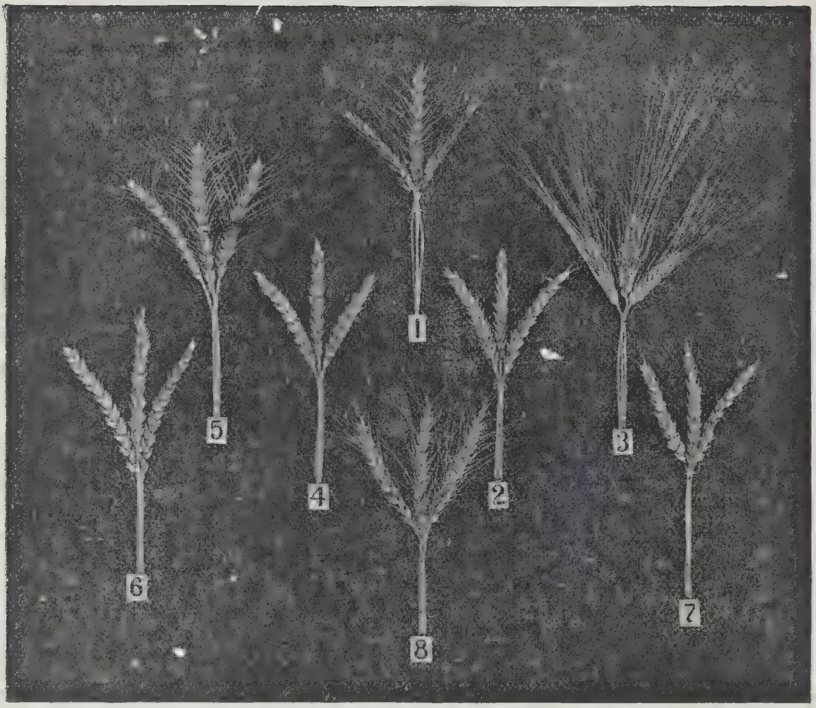
An average crop of 39 bushels 43 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

Average for six years.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Russian | 28 | 15 | 7. Herisson Bearded | 26 | 15 |
| 2. Preston | 27 | 23 | 8. Wellman's Fife | 26 | 8 |
| 3. Monarch | 27 | 8 | 9. Countess | 26 | 5 |
| 4. Red Fife | 26 | 38 | 10. White Connell | 25 | 55 |
| 5. Dawn | 26 | 20 | 11. Hungarian | 25 | 54 |
| 6. Huron | 26 | 18 | 12. White Fife | 25 | 44 |

An average crop of 26 bushels 30 lbs. per acre.




Some of the heaviest average yielders in six years trial of Spring Wheats. No. 1, Preston; 2, Red Fife; 3, Goose; 4, White Fife; 5, Huron; 6, Wellman's Fife; 7, White Russian; 8, Rio Grande.

The twelve varieties of spring wheat which have produced the largest crops, taking the average of the results obtained for the past five and six years on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston.................. | 35 | 5 | 7. White Connell.......... | 31 | 19 |
| 2. Monarch................. | 32 | 37 | 8. Huron...... ........... | 31 | 15 |
| 3. Wellman's Fife.......... | 32 | 32 | 9. White Russian.......... | 31 | 8 |
| 4. White Fife .............. | 31 | 36 | 10. Rio Grande............ | 31 | 6 |
| 5. Goose.................... | 31 | 30 | 11. Hungarian, 5 yrs........ | 30 | 52 |
| 6. Red Fife ................ | 31 | 29 | 12. Pringle's Champlain.... | 30 | 52 |

An average crop of 31 bushels 47 lbs. per acre.

## THREE TO SIX YEARS' EXPERIENCE WITH VARIETIES OF PEASE.

The twelve varieties of pease which have averaged the heaviest crops at the several experimental farms for the past three to six years, are the following :

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur, 5 yrs | 39 | 6 | 7. Mummy, 5 yrs | 34 | 2 |
| 2. Macoun, 5 yrs | 36 | .. | 8. Agnes, 5 yrs | 33 | 57 |
| 3. Kent, 5 yrs | 35 | 37 | 9. Prussian Blue, 6 yrs | 33 | 50 |
| 4. Duke, 5 yrs | 35 | 18 | 10. Mackay, 5 yrs | 33 | 24 |
| 5. Paragon, 5 yrs | 35 | 2 | 11. Creeper, 5 yrs | 33 | 22 |
| 6. Blk-Eyed Marrowfat, 5 yrs | 34 | 10 | 12. Canadian Beauty, 4 yrs | 33 | 7 |

An average crop of 34 bushels 44 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown, 5 yrs | 39 | .. | 7. Duke, 4 yrs | 27 | 44 |
| 2. Pride, 4 yrs | 33 | 45 | 8. Agnes, 4 yrs | 26 | 25 |
| 3. Centennial, 5 yrs | 32 | 40 | 9. Canadian Beauty, 5 yrs | 25 | 56 |
| 4. Blk-Eyed Marrowfat, 5 yrs | 30 | 48 | 10. Multiplier, 5 yrs | 25 | 56 |
| 5. New Potter, 5 yrs | 30 | 20 | 11. Prince, 4 yrs | 25 | 45 |
| 6. Carleton, 4 yrs | 28 | 24 | 12. Paragon, 4 yrs | 25 | 44 |

An average crop of 29 bushels 22 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pride, 6 yrs | 47 | 17 | 7. New Potter, 6 yrs | 42 | 53 |
| 2. Carleton, 5 yrs | 46 | 20 | 8. Kent, 5 yrs | 42 | 32 |
| 3. Mummy, 6 yrs | 45 | [illegible] | 9. Crown, 6 yrs | 42 | 27 |
| 4. White Wonder, 4 yrs | 45 | 2 | 10. Mackay, 5 yrs | 42 | 4 |
| 5. Trilby, 5 yrs | 44 | 10 | 11. Archer, 4 yrs | 41 | 30 |
| 6. King, 4 yrs | 43 | 22 | 12. Blk-Eyed Marrowfat, 6 yrs | 40 | 42 |

An average crop of 43 bushels 39 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Trilby, 4 yrs | 40 | 40 | 7. Prince Albert, 4 yrs | 34 | 57 |
| 2. Carleton, 4 yrs | 39 | 2 | 8. Centennial, 4 yrs | 34 | 5 |
| 3. Paragon, 4 yrs | 38 | 37 | 9. Perth, 3 yrs | 33 | 46 |
| 4. Crown, 4 yrs | 38 | 30 | 10. Macoun, 4 yrs | 33 | 45 |
| 5. Archer, 3 yrs | 35 | 36 | 11. Creeper, 4 yrs | 33 | 40 |
| 6. Duke, 4 yrs | 35 | 22 | 12. White Wonder, 3 yrs | 33 | 36 |

An average crop of 35 bushels [illegible] lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. King, 4 yrs | 34 | 35 | 7. Perth, 4 yrs | 29 | 15 |
| 2. White Wonder, 4 yrs | 33 | 7 | 8. Archer, 4 yrs | 29 | 9 |
| 3. Victoria, 4 yrs | 32 | 34 | 9. Vincent, 4 yrs | 29 | .. |
| 4. Early Britain, 4 yrs | 30 | 59 | 10. Chancellor, 4 yrs | 28 | 50 |
| 5. Bright, 4 yrs | 30 | 27 | 11. Prussian Blue, 4 yrs | 28 | 29 |
| 6. Arthur, 5 yrs | 29 | 42 | 12. Macoun, 5 yrs | 28 | 2 |

An average crop of 30 bushels 21 lbs. per acre.

The twelve varieties of pease which have produced the largest crops for the past three to six years, taking the average of the results obtained at all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown | 35 | 28 | 7. Mummy | 32 | 20 |
| 2. Carleton | 34 | 25 | 8. Centennial | 32 | 12 |
| 3. Pride | 33 | 52 | 9. Trilby | 32 | 9 |
| 4. New Potter | 32 | 41 | 10. Archer | 32 | 6 |
| 5. Early Britain | 32 | 39 | 11. King | 32 | .. |
| 6. Duke | 32 | 37 | 12. Paragon | 31 | 54 |

An average crop of 32 bushels 52 lbs. per acre.

## FIVE AND SIX YEARS' EXPERIENCE WITH VARIETIES OF INDIAN CORN.

(Where not otherwise marked the figures given are the results of six years tests.)

The six varieties of Indian Corn which have averaged the heaviest crops at the several experimental farms during the past five or six years, are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage | 24 | 1366 | 4. Selected Leaming, 5 yrs. | 23 | 563 |
| 2. Giant Prolific Ensilage | 24 | 294 | 5. Champion White Pearl | 21 | 124 |
| 3. Thoro'bred White Flint | 24 | 226 | 6. White Cap Yellow Dent | 20 | 358 |

An average crop of 22 tons 1,822 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint | 18 | 78 | 4. Selected Leaming, 5 yrs. | 16 | 274 |
| 2. Red Cob Ensilage | 16 | 1585 | 5. Angel of Midnight | 15 | 1652 |
| 3. Sanford | 16 | 390 | 6. Canada White Flint | 15 | 1460 |

An average crop of 16 tons 906 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint | 21 | 1098 | 4. Compton's Early | 18 | 1767 |
| 2. Angel of Midnight | 21 | 625 | 5. Red Cob Ensilage | 18 | 1708 |
| 3. Longfellow | 19 | 903 | 6. Champion White Pearl | 18 | 1418 |

An average crop of 19 tons 1,586 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Thoro'bred White Flint | 11 | 1632 | 4. Compton's Early | 11 | 1151 |
| 2. Mamm. 8-rowed Flint | 11 | 1522 | 5. Champion White Pearl | 11 | 1097 |
| 3. Sanford | 11 | 1157 | 6. Selected Leaming | 11 | 1025 |

An average crop of 11 tons 1,264 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage....... | 25 | 1 | 4. Pride of the North..... | 21 | 966 |
| 2. Selected Leaming....... | 22 | 1822 | 5. Giant Prolific Ensilage.. | 21 | 783 |
| 3. King of the Earliest .... | 21 | 1158 | 6. Champion White Pearl.. | 20 | 192 |

An average crop of 22 tons 152 lbs. per acre

The six varieties of Indian corn which have produced the largest crops for the past five or six years, taking the average of the results obtained on all the experimental farms, are :

| | Per Acre. Tons. | Lbs. | | Per Acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage..... . | 19 | 718 | 4. Giant Prolific Ensilage.. | 17 | 1580 |
| 2. Thoro'bred White Flint. | 18 | 1555 | 5. Angel of Midnight...... | 17 | 723 |
| 3. Selected Leaming....... | 18 | 788 | 6. Champion White Pearl.. | 17 | 657 |

An average crop of 21 tons 1,604 lbs. per acre.

## FIVE YEARS' EXPERIENCE WITH VARIETIES OF TURNIPS.

The six varieties of turnips which have averaged the heaviest crops at the several experimental farms during the past five years, are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per Acre. Tons | Lbs. | | Per Acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top..... | 36 | 830 | 4. Mammoth Clyde........ | 33 | 1727 |
| 2. Carter's Elephant....... | 35 | 400 | 5. Jumbo.................. | 33 | 310 |
| 3. Perfection Swede........ | 34 | 1336 | 6. East Lothian ........... | 32 | 1879 |

An average crop of 34 tons 896 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per Acre. Tons | Lbs. | | Per Acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze........ | 34 | 945 | 4. Skirvings .............. | 33 | 350 |
| 2. Perfection Swede ....... | 34 | 303 | 5. Selected Purple Top..... | 32 | 1108 |
| 3. Carter's Elephant....... | 33 | 566 | 6. Mammoth Clyde........ | 32 | 282 |

An average crop of 33 tons 592 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per Acre. Tons | Lbs. | | Per Acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top..... | 24 | 945 | 4. Skirving's............. | 22 | 1249 |
| 2. Hartley's Bronze........ | 23 | 1282 | 5. Champion Purple Top... | 22 | 410 |
| 3. Perfection Swede ....... | 23 | 543 | 6. East Lothian ........... | 22 | 273 |

An average crop of 23 tons 100 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per Acre. Tons | Lbs. | | Per Acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Perfection Swede, 5 years | 20 | 6 | 4. Selected Purple Top..... | 19 | 545 |
| 2. Hartley's Bronze........ | 19 | 1316 | 5. Mammoth Clyde........ | 19 | 146 |
| 3. Champion Purple Top... | 19 | 935 | 6. Bangholm Selected 4 yrs. | 18 | 1873 |

An average crop of 19 tons 803 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons | Lbs. | | Per acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Bangholm Selected...... | 45 | 197 | 4. Jumbo.................. | 38 | 956 |
| 2. Selected Purple Top, 4 y'rs | 41 | 642 | 5. East Lothian........... | 38 | 291 |
| 3. Perfection Swede....... | 40 | 1129 | 6. Giant King............. | 37 | 1817 |

An average crop of 40 tons 505 lbs. per acre.

The six varieties of turnips which have produced the largest crops, taking the average of the results obtained on all the experimental farms for the past five years, are:

| | Per acre. Tons | Lbs. | | Per acre. Tons | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Purple Top..... | 30 | 1614 | 4. East Lothian.......... | 28 | 1380 |
| 2. Perfection Swede....... | 30 | 1063 | 5. Hartley's Bronze........ | 28 | 1126 |
| 3. Bangholm Selected...... | 29 | 397 | 6. Skirvings.............. | 27 | 1930 |

An average crop of 29 tons 585 lbs. per acre.

## FOUR AND FIVE YEARS' EXPERIENCE WITH VARIETIES OF MANGELS.

The six varieties of mangels which have averaged the heaviest crops at the several experimental farms for the past four and five years, are the following:

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post, 5 yrs.......... | 39 | 188 | 4. Canadian Giant, 5 yrs.... | 35 | 1670 |
| 2. Giant Yellow Intermediate, 5 yrs............... | 37 | 1746 | 5. Yellow Intermediate, 5 yrs | 35 | 608 |
| 3. Mammoth Long Red, 5 yrs | 36 | 1590 | 6. Giant Yellow Globe, 5 yrs. | 34 | 1464 |

An average crop of 36 tons 1,211 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate, 5 yrs............... | 34 | 1405 | 4. Norbiton Giant, 4 yrs .... | 32 | 231 |
| 2. Yellow Intermediate, 5 yrs | 33 | 66 | 5. Giant Yellow Globe, 5 yrs. | 31 | 1015 |
| 3. Giant Yellow Half Long, 4 yrs.................. | 32 | 879 | 6. Gate Post, 5 yrs.......... | 30 | 499 |

An average crop of 32 tons 682 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Selected Mamm. Long Red 4 yrs.................. | 36 | 616 | 4. Gate Post, 5 yrs.......... | 33 | 831 |
| 2. Yellow Intermediate, 5 yrs | 34 | 274 | 5. Prize Mamm. Long Red, 5 yrs............. | 32 | 1947 |
| 3. Giant Yellow Intermediate, 5 yrs.............. | 33 | 1438 | 6. Giant Yellow Globe, 5 yrs | 30 | 1630 |

An average crop of 33 tons 1,123 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Yellow Intermediate, 5 yrs | 22 | 1964 | 4. Selected Mamm. Long Red 4 yrs.................. | 22 | 1046 |
| 2. Champion Yellow Globe, 5 yrs.................. | 22 | 1396 | 5. Gate Post, 5 yrs ........ | 22 | 133 |
| 3. Giant Yellow Half Long, 4 years................. | 22 | 1151 | 6. Norbiton Giant, 5 yrs.... | 21 | 917 |

An average crop of 22 tons 768 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ B.C.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Yellow Intermediate, 5 yrs | 38 | 65 |
| 2. Giant Yellow Intermediate, 5 yrs | 33 | 1902 |
| 3. Giant Yellow Half Long, 4 yrs | 33 | 80 |
| 4. Selected Mamm. Long Red 4 yrs | 33 | |
| 5. Gate Post, 5 yrs | 31 | 158 |
| 6. Mamm. Long Red, 4 yrs | 30 | 1531 |

An average crop of 33 tons 623 lbs. per acre.

The six varieties of mangels which have produced the largest crops for the past four or five years, taking the average of the results obtained at all the experimental farms, are :

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Yellow Intermediate | 32 | 1513 |
| 2. Giant Yellow Intermediate | 32 | 226 |
| 3. Gate Post | 31 | 162 |
| 4. Selected Mamm. Long Red | 30 | 855 |
| 5. Giant Yellow Half Long | 30 | 57 |
| 6. Giant Yellow Globe | 28 | 1816 |

An average crop of 31 tons 21 lbs. per acre.

## FOUR AND FIVE YEARS' EXPERIENCE WITH VARIETIES OF CARROTS.

The six varieties of carrots which have produced the heaviest crops at the several experimental farms for the past four or five years are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Giant White Vosges, 5 yrs | 29 | 54 |
| 2. Improved Short White, 5 yrs | 28 | 716 |
| 3. Mammoth White Intermediate, 5 yrs | 27 | 1308 |
| 4. Iverson's Champion, 5 yrs | 27 | 1044 |
| 5. Half Long White, 5 yrs | 26 | 909 |
| 6. Green Top White Orthe, 4 yrs | 26 | 264 |

An average crop of 27 tons 1,049 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Half Long White, 5 yrs | 21 | 1219 |
| 2. Mammoth White Intermediate, 5 yrs | 20 | 1688 |
| 3. Giant White Vosges, 5 yrs | 19 | 1522 |
| 4. Green Top White Orthe, 4 yrs | 19 | 892 |
| 5. Improved Short White, 5 yrs | 19 | 193 |
| 6. Iverson's Champion, 5 yrs | 18 | 1635 |

An average crop of 19 tons 1,858 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Half Long White, 5 yrs | 12 | 1828 |
| 2. Giant White Vosges, 5 yrs | 12 | 1828 |
| 3. Iverson's Champion, 5 yrs | 12 | 1784 |
| 4. Early Gem, 5 yrs | 12 | 1124 |
| 5. Mammoth White Intermediate, 5 yrs | 12 | 662 |
| 6. White Belgian, 5 yrs | 11 | 176 |

An average crop of 12 tons 901 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White, 5 yrs.................. | 34 | 224 | 4. Green Top White Orthe 4 yrs.................. | 29 | 1931 |
| 2. Giant White Vosges, 5 yrs. | 32 | 880 | 5. Yellow Intermediate 5 yrs. | 29 | 329 |
| 3. Half Long White 5 yrs... | 32 | 44 | 6. Mammoth White Intermediate, 5 yrs............ | 28 | 1198 |

An average crop of 31 tons 101 lbs. per acre.

The six varieties of carrots which have produced the largest crops during the past four or five years, taking the average of the results obtained on all the experimental farms, are:

| | Per acre. Tons. | Lbs | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White........ | 20 | 1721 | 4. Mammoth White Intermediate.................. | 19 | 1786 |
| 2. Giant White Vosges...... | 20 | 1615 | 5. Iverson's Champion...... | 19 | 1329 |
| 3. Improved Short White ... | 20 | 1584 | 6. Green Top White Orthe.. | 18 | 1976 |

An average crop of 20 tons 335 lbs. per acre.

## THREE AND FOUR YEARS' EXPERIENCE WITH VARIETIES OF SUGAR BEETS.

The four varieties of sugar beets which have averaged the heaviest crops at the several experimental farms for the past three or four years are the following:

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial, 4 yrs | 26 | 100 | 3. Danish Improved, 4 yrs.. | 25 | 586 |
| 2. Wanzleben, 4 years..... | 25 | 1823 | 4. Danish Red Top, 3 yrs.. | 22 | 1925 |

An average crop of 25 tons 108 lbs. per acre.

EXPERIMENTAL FARM FOR MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar, 4 years.. | 26 | 1631 | 3. Improved Imperial 4 yrs | 24 | 1003 |
| 2. Danish Red Top, 3 years | 25 | 733 | 4. Danish Improved 4 yrs. | 22 | 812 |

An average crop of 24 tons 1,545 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top, 3 years, | 32 | 570 | 3. Wanzleben, 4 years...... | 25 | 77 |
| 2. Danish Improved, 4 yrs.. | 26 | 222 | 4. Red Top Sugar, 4 years.. | 23 | 1786 |

An average crop of 26 tons 1,664 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top, 3 years. | 16 | 1719 | 3. Red Top Sugar, 4 years.. | 14 | 80 |
| 2. Wanzleben, 4 years...... | 15 | 586 | 4. Danish Improved, 4 yrs. | 13 | 374 |

An average crop of 14 tons 1,190 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre Tons. | Lbs. |
|---|---|---|
| 1. Improved Imperial, 4 yrs | 24 | 40 |
| 2. Danish Improved, 4 yrs. | 23 | 992 |
| 3. Red Top Sugar, 4 years. | 23 | 705 |
| 4. Vilmorin's Improved, 4 years. | 22 | 1694 |

An average crop of 23 tons 858 lbs. per acre.

The four varieties of sugar beets which have produced the largest crops for the past three or four years, taking the average results obtained at all the experimental farms, are :

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Danish Red Top, 3 years | 26 | .658 |
| 2. Danish Improved, 4 years | 22 | 197 |
| 3. Red Top Sugar, 4 years. . | 22 | 183 |
| 4. Wanzleben, 4 years. | 21 | 1019 |

An average crop of 23 tons 14 lbs. per acre.

## FOUR TO SIX YEARS' EXPERIENCE WITH VARIETIES OF POTATOES.

The twelve varieties of potatoes which have averaged the heaviest crops at the several experimental farms, during the past four to six years, are the following :

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Holborn Abundance, 6 yrs | 419 | 28 |
| 2. American Wonder, 6 yrs. | 411 | 56 |
| 3. Seedling No. 230, 6 years | 392 | 41 |
| 4. Late Puritan, 6 years. | 389 | 43 |
| 5. Empire State, 6 years. | 378 | 17 |
| 6. Everett, 6 years. | 371 | 3 |
| 7. Burnaby Seedling, 6 yrs | 365 | 30 |
| 8. Vanier, 6 years. | 362 | 49 |
| 9. State of Maine, 6 years. | 362 | 32 |
| 10. Seattle, 6 years. | 362 | 8 |
| 11. Polaris, 6 years. | 360 | 49 |
| 12. Early Norther, 6 years. | 358 | 56 |

An average crop of 377 bushels 59 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Seedling No. 230, 5 yrs. . | 461 | 43 |
| 2. American Giant, 4 yrs. | 434 | 16 |
| 3. Irish Daisy, 6 yrs. | 433 | 15 |
| 4. Holborn Abundance, 6 yrs | 433 | 10 |
| 5. Seattle, 5 yrs. | 422 | 59 |
| 6. Carman No. 1, 6 yrs. | 405 | 24 |
| 7. Hale's Champion, 5 yrs. . | 400 | 16 |
| 8. Pearce's Prize Winner, 5 yrs. | 396 | 36 |
| 9. Pride of the Market, 6 yrs. | 391 | 10 |
| 10. Vanier, 5 yrs. | 383 | 54 |
| 11. Reading Giant, 5 yrs. | 380 | 27 |
| 12. Green Mountain, 5 yrs., | 379 | 28 |

An average crop of 410 bushels 13 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Irish Daisy, 5 yrs. | 390 | 8 |
| 2. Delaware, 5 yrs. | 381 | 20 |
| 3. Carman No. 1, 6 yrs. | 370 | 57 |
| 4. Late Puritan, 6 yrs. | 363 | .. |
| 5. Dreer's Standard, 6 yrs. . | 363 | .. |
| 6. Clarke's No. 1, 6 yrs. | 359 | 57 |
| 7. Great Divide, 6 yrs. | 358 | 7 |
| 8. State of Maine, 6 yrs .. | 354 | 45 |
| 9. New Variety No. 1, 5 yrs | 353 | 28 |
| 10. Pearce's Prize Winner, 5 yrs. | 349 | 48 |
| 11. Chicago Market, 5 yrs. . | 344 | 40 |
| 12. Pride of the Market, 6 yrs. | 344 | 40 |

An average crop of 361 bushels 9 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTHWEST TERRITORIES, INDIAN HEAD, N.W.T.

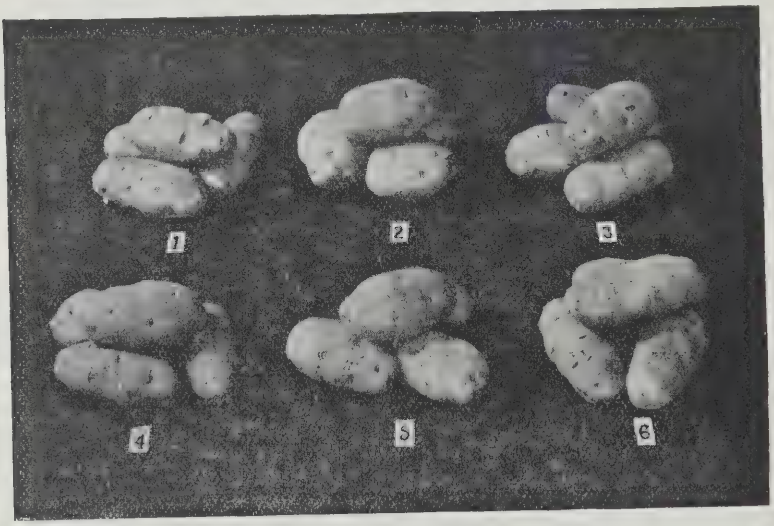
| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. American Giant, 5 yrs... | 473 | 50 |
| 2. American Wonder, 6 yrs. | 434 | 33 |
| 3. Rochester Rose, 5 yrs... | 439 | 6 |
| 4. Vick's Extra Early, 5 yrs | 425 | 2 |
| 5. Lee's Favorite, 5 yrs.... | 419 | 4 |
| 6. New Variety No. 1, 5 yrs | 405 | 6 |
| 7. Brownell's Winner, 6 yrs ............... | 391 | 25 |
| 8. General Gordon, 4 yrs.. | 386 | 26 |
| 9. Empire State, 6 yrs .... | 384 | .. |
| 10. Lizzie's Pride, 6 yrs.... | 382 | 40 |
| 11. Northern Spy, 6 yrs.... | 382 | 16 |
| 12. Houlton Rose, 4 yrs.... | 376 | 51 |

An average crop of 400 bushels 2 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Dakota Red, 6 yrs....... | 358 | 36 |
| 2. Brown's Rot Proof, 4 yrs. | 354 | 29 |
| 3. Seedling No. 230, 5 yrs.. | 352 | 51 |
| 4. Clay Rose, 6 yrs ........ | 346 | 55 |
| 5. Houlton Rose, 4 yrs..... | 346 | 49 |
| 6. Reading Giant, 6 yrs.... | 343 | 5 |
| 7. Irish Daisy, 6 yrs ....... | 330 | 41 |
| 8. Vick's Extra Early, 4 yrs | 328 | 4 |
| 9. Carman No. 3, 6 yrs.... | 317 | 29 |
| 10. Troy Seedling, 6 yrs.... | 317 | 14 |
| 11. New Variety No. 1, 6 yrs...... ........ | 308 | 11 |
| 12. Brownell's Winner, 5 yrs...... ......... | 307 | 58 |

An average crop of 334 bushels 22 lbs. per acre.




Some of the heaviest yielding potatoes, average of six years trial. No. 1 Everett, early, pink; 2, Carman, No. 1, medium early, white; 3, Rochester Rose, early, pink; 4, American Wonder, late, white; 5, Late Puritan, medium late, white; 6, Empire State, medium late, white.

The twelve varieties of potatoes which have produced the largest crops for the past four to six years, taking the average of the results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Seedling No. 230........ | 376 | 40 |
| 2. Irish Daisy.............. | 371 | 14 |
| 3. American Giant ........ | 367 | 18 |
| 4. American Wonder ...... | 365 | 40 |
| 5. Empire State........... | 351 | 27 |
| 6. Carman No. 1........... | 348 | 15 |
| 7. Late Puritan........... | 348 | 9 |
| 8. State of Maine. ........ | 341 | 24 |
| 9. New Variety No. 1...... | 340 | 44 |
| 10. Seattle ................. | 338 | 29 |
| 11. Vanier ................. | 337 | 27 |
| 12. General Gordon........ | 337 | 10 |

An average crop of 352 bushels per acre.

## SUMMARY.

The evidence furnished by the work of another year adds further testimony to the importance of choosing the best and most productive varieties for seed, and confirms the view that there are marked and fairly constant differences in the productiveness of varieties when grown side by side under similar conditions. Among the 41 different sorts of oats which have been subject to uniform tests for six years, nine of these have appeared among the twelve most productive sorts every year for the whole period, and the other three places have been filled during the time at irregular intervals by six other varieties. Hence only fifteen of the 41 varieties have produced a crop sufficiently large during the whole of that time to entitle them to a place with the best twelve sorts. On comparing the best twelve varieties this year with the best twelve of 1899 we find that ten of them are the same.

Taking the results of the cropping of the twelve most productive sorts of oats at the Central Experimental Farm for six years, where the climate and soil are fairly representative of the two great provinces of Ontario and Quebec, we find that they have given an average yield for the whole period of 69 bushels 17 lbs. per acre. The remaining 29 varieties have averaged during the same time 51 bushels 7 lbs. per acre, an average difference in favor of the productive sorts of 18 bushels 10 lbs. per acre. The value of these figures is more fully realized if we bear in mind that every bushel of oats added to the average crop of Canada puts about one million dollars into the pockets of Canadian farmers.

In spring wheat we find similar persistent productiveness in certain sorts. Of the 31 varieties of this cereal which have been tested for six consecutive years, eight of these have appeared among the twelve most productive every year for the whole period. Comparing the best twelve varieties for 1899 with the best twelve for 1900 we find that eleven of them are the same. Taking the results of the cropping of the best twelve sorts of spring wheat for six years at the Central farm we find that they have averaged for the whole period 26 bushels 57 lbs. per acre, while the remaining nineteen varieties grown for the same period have averaged 20 bushels 30 lbs. per acre an average difference in favor of the best twelve sorts of 6 bushels 27 lbs. per acre.

Similar evidence is afforded by the trial plots of potatoes. Comparing the twelve best sorts for 1900 with those of 1899 we find that nine of them are the same. Sixty-two varieties of potatoes have been under trial for five or six successive years at all the experimental farms, and while the twelve most productive sorts have averaged during that period 352 bushels per acre, the remaining 50 have given an average of 294 bushels 51 lbs., an average difference in favor of the best twelve sorts of 57 bushels 9 lbs. per acre.

Additional evidence of a similar character could be deduced from the results of other crops did space permit. The facts presented should induce farmers to choose the most productive sorts for sowing, a practice which if generally followed would no doubt result in a material increase in the average crops of the country and thus make farming more profitable.

DEPARTMENT OF AGRICULTURE

CENTRAL EXPERIMENTAL FARM
OTTAWA, CANADA

# APPLE CULTURE

## AND DISTRICT LISTS OF APPLES SUITABLE FOR ONTARIO AND QUEBEC

WITH

## DESCRIPTIONS OF VARIETIES

BY

W. T. MACOUN

*Horticulturist, Central Experimental Farm*

BULLETIN No. 37

APRIL, 1901

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE

To the Honourable
The Minister of Agriculture.

SIR,—I beg to submit for your approval Bulletin No. 37 of the Experimental Farm series, which has been prepared under my direction by Mr. W. T. Macoun, Horticulturist of the Central Experimental Farm.

The subject treated of is Apple Culture and the information presented has been derived mainly from the experimental work carried on in connection with apple growing at the Central Farm during the past twelve years. In this bulletin there will be found full information as to the best methods of preparing the soil for an orchard, with particulars also as to the planting and subsequent care of the trees. Instructions are also given as to pruning, grafting and on many other topics relating to this branch of the fruit industry. Lists of varieties of apples are submitted which ripen at different seasons and which are suitable for planting in different parts of Ontario and Quebec and full descriptions as to the character and quality of these varieties are also given. Some of the diseases to which apple trees are subject are also referred to, and a brief account is given by Dr. James Fletcher, Entomologist and Botanist to the Experimental Farms, of some of the more important insects which are injurious to the apple.

It is hoped that the information submitted will be useful to those interested in the cultivation of this fruit in Canada, that it will prove a stimulus to further planting both for home use and export, and that it may aid in making the growing of apples in this country more successful and more profitable.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,

*Director Experimental Farms.*

OTTAWA, April 1, 1901.

# APPLE CULTURE

BY

W. T. MACOUN,

*Horticulturist, Central Experimental Farm, Ottawa.*

The apple is the most important and useful fruit in all civilized parts of the north temperate zone where it can be grown successfully. While other fruits are, in a greater or less degree, regarded as luxuries, the apple is part of our regular diet and much would this wholesome and delicious fruit be missed were we unable to procure it.

The origin of the cultivated apple is wrapped in mystery. It is supposed, however, that it had its beginning in the wild apple of Europe (*Pyrus Malus*), but there is no evidence to show when the improvement began, nor when the fruit reached the size, colour and quality of what is regarded as a good apple to-day. It is known, however, that at the beginning of the Christian era, the Romans cultivated a few varieties of apples which might compare favourably with some that are grown at the present time. Although the apple is mentioned in Holy Scripture many years prior to that period, it is now thought that the word referred to another fruit, or other fruits, and not to what is now called an apple.

While the range of successful culture of many other fruits is comparatively limited, the apple has a very wide one in the temperate climates of the old and new worlds and is able to accommodate itself to conditions under which many other cultivated fruits would not thrive. It is, however, in the temperate parts of America where it reaches the highest state of perfection, and where there is an ever increasing area devoted to this fruit. Named varieties of apples are very numerous, being, probably, over 2,500 in number, so that every taste, no matter how eccentric, may be satisfied, and a selection made of those best suited to a particular person or place. It is a very attractive fruit, the red and yellow, which are the predominant colours, varying much in shade and prominence.

No other fruit, probably, has as long a season as the apple. By a judicious selection of varieties, apples may be had in good condition the whole year round, and now that the system of cold storage has been so perfected, some of the best varieties, which, under ordinary circumstances, would not keep until spring, may be had in good order late in the following summer.

The uses of the apple are too well known to need mention. Truly, this is the king of fruits.

The profits from apple growing may be large or may be small ; much depending on the varieties planted, the markets, and most of all on the man and his methods of growing this fruit. Some varieties begin to bear paying crops when five years planted. Most of the best sorts, however, do not bear heavily for ten years or more. The profitable life of an apple tree will depend

greatly on the climate it is grown in, the culture given, and the variety. There are, however, other factors which influence it. In the best apple districts of America, profitable crops are gathered from trees sixty to one hundred years of age.

### APPLE CULTURE IN THE PROVINCES OF ONTARIO AND QUEBEC.

It was not until forty or fifty years ago that the apple industry began to assume much importance in the province of Ontario, although apples had been grown there since the early years of the 19th century, and probably before. Apple culture has increased very rapidly during recent years and continues to make steady growth. From the statistics for 1900, we learn that the yield of apples for that year was estimated at 36,993,017 bushels; that there were 6,518,048 trees of bearing age, and 3,430,670 young trees in the province. The export of apples from this province is also very large.

In the province of Quebec, apples have been grown for a much longer period than in Ontario. There are records which show that as long ago as 1663 this fruit was being produced there. While the industry has not grown as rapidly as in Ontario, there are now many large orchards in the province, and the area devoted to this fruit is increasing every year and more apples are being exported. On the Island of Montreal, alone, there are now about 2,400 acres of orchard of which most of the trees are apples, and the product is estimated at from 250,000 to 275,000 barrels annually. The future of the apple industry in Canada seems very bright. The best flavoured, most highly coloured and longest keeping fruit is produced in Canada. Apples can be grown successfully on a large scale in the provinces of Ontario and Quebec from latitude 42° to latitude 45°, and from below the city of Quebec west to the great lakes; an immense tract of country which, although not all suitable for apple growing, will furnish enough good land to produce all of this fruit that will be required to supply the world for many years to come.

While it is doubtful whether apples can be grown economically for export in the provinces of Ontario and Quebec on a large scale much north of latitude 45°, they have been grown as far north as latitude 48° 26′, at Chicoutimi, in the province of Quebec, and there is every reason to believe that they can be grown even further north than this in both provinces, if only the hardiest varieties are planted and better care taken of the trees than in the more favoured districts. These northern orchards will probably be able to supply all the local demand, and perhaps more.

The market for good apples in Great Britain and Europe is at the present time practically unlimited and will probably be so for a long time.

With the favourable conditions for growing apples which prevail in this country, Canadian apples should take first place on the markets of the world, if the proper kinds of fruit are grown, and if it is placed on the markets in prime condition.

### APPLE CULTURE AT THE CENTRAL EXPERIMENTAL FARM.

Most of the information contained in this Bulletin is the result of the experience gained in growing apple trees and apples at the Central Experimental Farm. The notes on apple insects and the remedies therefor, which will be found in the closing pages of this Bulletin, have been kindly prepared by Dr. James Fletcher, Entomologist and Botanist of the Dominion Experimental Farms, to whom I beg to acknowledge my indebtedness.

The lines of work at the Central Experimental Farm have included the testing of the hardiness, productiveness, quality and freedom from disease of the different varieties of apples. The different methods of propagating and grafting have also been tested, using various stocks for this purpose. The top-grafting of tender varieties on hardy stocks has received much attention of late years and good results are already apparent. Different methods of culture have been tried in the orchard and various cover crops have been tested to ascertain which were the best.

Spraying has been a prominent feature of the work since 1890, and many experiments have been tried with different mixtures and solutions for preventing and destroying insect pests and fungous diseases.

The apple orchards at the Central Experimental Farm were begun in the autumn of 1887, but it was not until the spring of 1888 that much progress was made. Since that time the number of varieties tested and the area devoted to this fruit have both increased very much. Up to the present time 645 varieties have been tested, most of which are now growing, though many of the kinds have been replaced several times. The Russian apples have received especial attention, as it was thought that these would prove of particular value for the northern parts of this country. There are now about 160 Russian varieties growing, though some of them may be synonyms. There are 1,271 apple trees in the orchard at present, occupying about 18½ acres of land.

In addition to this there is a Russian seedling plantation, occupying about an acre, and a small orchard of Wealthy apple trees alone.

Much work has also been done in cross-breeding and hybridizing apples for the purpose of obtaining hardier trees or better varieties.

### INTRODUCTION OF VARIETIES.

Many varieties of apples have been tested in Canada and the United States since these countries were first settled, and during the last century, especially, the number has increased very rapidly. These have either been introduced from Great Britain and Europe or have been originated in America. It has been found that a much larger proportion of the varieties which have originated in America, are more profitable sorts to grow than of those from other countries, and in Canada the facts are much the same, except in the very coldest parts of the country, where apples can be grown, and there the Russian varieties take a predominant place, but this is probably because the colder parts of the country have not been settled so long, and hardy seedlings of value are, on this account, not so often met with.

During the past thirteen years, 645 varieties of apples have been tested at the Central Experimental Farm, at Ottawa. These have been obtained from many sources, but the largest proportion of them were of Russian and American origin.

Of the apples which are succeeding best at Ottawa, nearly all the most profitable summer varieties are of Russian origin, but most of the best autumn and winter sorts were originated in America.

### ORIGIN OF VARIETIES.

Varieties are originated in three different ways. First, from seed; second, by cross-fertilization and hybridization; and third, by sporting or bud variation.

## SEEDLING VARIETIES.

Most of the named varieties of apples growing in America to-day were originated as seedlings. Our forefathers brought apple seeds with them from the old land and sowed them in this country. The young trees raised from these grew up and bore fruit, and occasionally a variety of merit would thus be produced, and then propagated. In later times chance seedlings grew up in the fence corners and other waste places, and these also bore fruit and added their quota of good sorts. From trees like these have originated such fine varieties as Northern Spy, Baldwin, Fameuse, McIntosh Red, and many others.

Of late years more systematic efforts have been made to originate new varieties from seed. But the varieties of really useful apples which have originated in this way have been very few indeed. The late Peter Gideon, of Excelsior, Minn., U.S., devoted probably more time to this work than any other man in America. He published the results of his experience in the Thirteenth Annual Report of the Minnesota State Horticultural Society. The following are extracts from that report :—

'Our efforts and trials in Minnesota began thirty years ago last spring by planting one bushel of apple seed, a peck of peach seed, and five hundred apple, pear, plum and cherry trees, and for eleven years thereafter planted each year enough apple seed to bring 1,000 trees, and in the time named frequent additions to the orchard of old named varieties—all southern or eastern grown trees and seeds, and all kept as long as they could be made to live in Minnesota, and to-day only two trees remain. One of these, the Wealthy, grown from a cherry-crab seed, obtained of Albert Emerson, of Bangor, Maine, of whom I obtained scions at the same time, from which I grew the Duchess, Blue Pearmain, and the Cherry-crab, all of which, combined, were the foundation of Minnesota horticulture, that to-day is the pride and hope of the North-west. But since these varieties came into bearing we have planted only of our own growing of seed, with forty first-class varieties the result.'

'Thus far it has taken from three to five hundred seedlings to give us one first-class apple, and that from seed taken from the best apples we had.'

Although the Wealthy apple is probably the most valuable variety of its season in the colder parts of Canada and the United States, Gideon's attempts to produce a hardy late keeping apple of very good quality were of no avail, and at the present time it is not known that any very good late keeping dessert apple exists which is adapted to the climate of Minnesota, or for the colder districts in Canada.

At the Central Experimental Farm at Ottawa, considerable work has been done in raising seedling apples, especially from seed of Russian varieties, but no kinds of great merit have yet been produced.

In the year 1890 an orchard was planted comprising about 3,000 trees grown from seed imported from E. Goegginger, Riga, Russia. The seed from which these were grown was said to have been taken from apples grown north of Riga. Russia. Of these there are now 898 remaining, the rest having been killed by blight or winter or removed on account of weak growth or inferior quality. These began to fruit in 1897, when about 50 trees bore. In 1898 there were 40 trees which fruited ; in 1899 there were 43, and in 1900 there were 26, making a total of 159 trees which have borne fruit. None of these apples are sufficiently promising to be worthy of special mention,

but a few of them are as good as the majority of the named Russian varieties. Nearly all of them are summer apples.

Many seedlings are now being grown of the best varieties of apples which have fruited at Ottawa, and it is hoped that some good varieties will be originated in this way.

From our own experience and the experience of others, it would appear that if a good late keeping apple is desired, the chances are very slight that it will be produced from seeds of an early apple. On the other hand, seeds from a late keeping apple will not, necessarily, produce late keeping varieties. Apples have been so inter-crossed, in nature, for hundreds of years, that the characteristics of many varieties are apparent in the seedlings of one. It is possible that there never was a case where a seedling of a cultivated variety of apple was identical in every respect with its parent. If it is desired, then, to originate a new variety, the following methods are recommended as being the most likely to produce the variety with the characteristics sought for, although thousands of seedlings may have to be grown to attain this purpose:—

1. To produce a hardy apple where no apples have yet been found hardy: Sow seeds of apples which have ripened in a climate as nearly similar as possible.

2. To produce a hardy long keeping apple of good quality: Sow seeds of long keeping apples of good quality which have ripened in a similar climate.

3. To produce an apple having certain characteristics, as regards hardiness, vigour and productiveness of tree, and quality, size and appearance of fruit: Sow seeds of varieties having most of the characteristics desired.

4. If seedlings are to be grown on a large scale, more varieties having the characteristics desired will probably be obtained if trees of several named sorts blossoming at the same time be planted in close proximity in the orchard, and the seeds used from fruit borne on these trees. The trees thus planted should combine all the good points in the standard aimed at, for the variety to be originated.

Apple seeds germinate best when sown in the autumn. If, however, it is not convenient to sow them at that time they may be stratified; that is, mixed with sand, slightly moist, but not wet, and kept in a cool but dry place until spring. Seeds should not be sown in the autumn in soil which heaves much; better hold them over and sow them as early in the spring as the soil can be worked. If apple seeds become very dry they may not always germinate satisfactorily, and this should be guarded against. The seed should be sown thinly, about two inches deep, in rows from 2½ to 3 feet apart. Or, if the quantity is small, beds may be prepared and the seed sown in rows about 6 inches apart. If sown in the autumn, most of them should germinate the following spring and make a growth of from one to two feet that season. They should be transplanted the following spring into rows from 2½ to 3 feet apart, placing them 12 inches apart in the rows. The next spring they should be in good condition for planting in the seedling orchard.

### CROSS-BRED AND HYBRID VARIETIES.

Those varieties which are originated by artificial cross-fertilization and hybridization are called cross-bred and hybrid, respectively. A hybrid is a cross between two species: as, for instance, between *Pyrus Malus*, the apple, or a variety of it, and *Pyrus baccata*, the Siberian crab. A cross-bred is a

cross between two varieties of the same species, as, for instance, between the Northern Spy and McIntosh Red apples.

Although nearly all our best apples have been originated as seedlings, the reason is, not that good varieties cannot be produced by artificial cross-fertilization and hybridization, but that comparatively little systematic work has been done in this direction in America until recent years. When one considers that a very large number of chance seedlings have been the result of the natural cross-fertilization of the flowers of different varieties (for it is now an established fact that many varieties of apples are self-sterile) it is reasonable to suppose that a much larger percentage of good apples will be obtained if the flowers are pollinated artificially, as then only the varieties which have the characteristics desired in the seedlings will be used as the parents, and although it has been already said that apples have been so inter-crossed in nature for hundreds of years that there is no certainty what the seedlings of any variety will be like, yet the characteristics of the parents will be more likely to predominate than those of varieties whose blood has intermingled at a more remote period. Before beginning any work of this kind, it is important, then, to decide what kind of an apple is most desired, and to select as parents those varieties which have as many of the qualities sought for as possible. The seedlings raised will probably have more of the characteristics of the female parent than of the male, and this should be taken into consideration when selecting the variety for that purpose. There is, however, no certainty in the matter, and in originating cross-bred apples it is wise to do some crossing with one variety as the female parent, and some with the same variety as the male parent. A hybrid, however, is almost certain to partake more of the female parent if the species differ widely.

The season when one may pollinate apple blossoms is very limited, as there is only from a week to ten days during which the work may be done.

In the blossom of the apple the organs of reproduction represent both sexes. When the pollen, which is the fine dust constituting the male part of the flower, comes in contact with the stigma, which is the upper part of the female organ, fertilization is liable to take place, and this must be prevented if artificial pollination is to be performed. The pollen which is contained in the anthers is shed almost as soon as the blossoms open, and work must begin, therefore, when the flower is in bud.

There are usually five or six buds in a cluster on apple trees, but generally only the strongest of these set fruit. The more the flower bud is developed, the greater chances there will be that artificial pollination will be successful. The operator, however, must be certain that no pollen has already been shed. Two or three of the weakest and least developed buds are pinched off and the remainder are left to be operated upon, or if some of the flowers are open they are removed and the others left. A pair of small tweezers are very good for this purpose. They should be perfectly smooth at the tips, both outside and inside, so that no pollen will lodge there. The petals of the buds are now removed by means of the tweezers; the anthers which contain the pollen are then removed, by breaking the filaments off, and thrown away. In removing the petals and anthers, great care should be taken that the stigmas are not injured, as, if they are, failure is certain. Only the female part of the flower now remains. The stigmas are in condition to receive the pollen when they become moist. They will remain in this condition for a day or two. Pollen may, however, be applied to the stigmas before they are ready, as pollen will stay in good condition longer than the stigmas. If the pollen is not applied

immediately, the flowers which have been operated upon should be covered with a stout paper bag and the mouth tied tightly about the twig, so that no insect can get in. Flower clusters of the variety of apple which is to supply the pollen and be the male parent of the future seedlings, should be gathered just before the buds open, and the twigs put in water until the blossoms open and the pollen is shed, which can be easily detected as the anthers burst open, when the pollen becomes quite visible to the naked eye. If the flowers are taken in the orchard after they open there is every probability that insects may have deposited pollen from other varieties there, and thus the parentage of the cross-bred variety would not be certain. When the pollen and stigmas are ready, the bag is removed and the stigmas then well covered with the pollen. This may either be effected by holding the flower in the fingers and rubbing the anthers against the stigmas, by putting some of the pollen on the finger nail and thus rubbing it on, or by applying it on the end of a knife or some other flat surface. The camel's hair brush which is often recommended is not a safe thing to use, as pollen may stick in the hairs, and if several kinds are worked with there will be no certainty as to the parentage. After this operation has been performed the bag should be put on again and tied tightly as before. A label should then be attached to the twig, on which should be written a number, the names of the male and female parents, the number of flowers operated on, and the date on which the work was done. This record should also be kept in a notebook. When the blossoming period is over and the fruit is well set the paper bag should be removed, a record taken of the number of apples which have set, and then a gauze or muslin bag tied over the fruit instead of the paper one. The apples should then be left to grow and ripen in the orchard. Late apples which are not thoroughly matured when harvested should be left as long as possible before the seeds are taken out. The seeds should be removed, however, in time to sow them before winter sets in. They should be counted and the number recorded with the other data, and then treated the same as has already been recommended in the paragraph on Seedling Varieties.

Flower of apple prepared for cross-fertilizing –1, flower just before opening; 2, the petals removed; 3, the anthers removed; 4, one of the anthers; 5 and 6, views of pollen highly magnified.

Much systematic work has been done in Canada in originating varieties of apples by cross-fertilization and hybridization. To the late Chas. Arnold, of Paris, Ont., and to the late P. C. Dempsey, of Trenton, Ont., is due great

credit for work done at a time when few were interested in the scientific aspects of fruit growing. The Ontario apple, which was originated by Chas. Arnold by crossing the Northern Spy with the Wagener, is a worthy memorial to that gentleman, it being one of our best and most profitable commercial apples. The Trenton and Walter apples are two of Mr. Dempsey's crosses, and are among the best apples of their season. The late horticulturist of the Central Experimental Farm, Mr. John Craig, also did some work in this direction, and it is expected that his crosses will begin to fruit next year. During the past two years we have done a limited amount of work also, the object being to obtain, if possible, hardy, late-keeping, productive apples of fine colour and good quality, which are much needed in northern and eastern Ontario and the Province of Quebec. Both seasons the McIntosh Red and Lawver apples have been used for this work. They are good sized red apples, and are perfectly hardy at Ottawa, being also annual, though not heavy, bearers. The McIntosh Red apple is probably unsurpassed in quality by any apple of its season. The Lawver apple is the best keeping apple yet fruited at the Central Experimental Farm, it having been kept in good condition in an ordinary cellar for over a year. Both of these apples have been used as the male and female parents, and it is hoped that an apple will be originated from them which will supply a long felt want in the colder parts of the country. The most comprehensive and extensive work of this kind, however, has been done by Dr. Wm. Saunders, Director of the Dominion Experimental Farms, and by his son, Dr. C. E. Saunders. While it is too soon yet to judge of the full value of this work, the results have been so satisfactory and encouraging thus far that there is good reason to believe that some of the varieties which have already fruited will prove hardy in places where the ordinary apple or crab apple will not survive the winters.

The following extract from the Director's Annual Report for 1899 will give some idea of the scope and results of this work :—

'During the spring of 1887, shortly after the work of the Experimental Farms was begun, a number of varieties of seeds was kindly forwarded to the director by the late Dr. Regel, who at that time had charge of the Royal Botanic Gardens at St. Petersburgh, Russia. Among these was a package of the seed of *Pyrus baccata*, a wild form of crab apple known as the berried crab, a native of the northern parts of Siberia. Young trees were grown from this seed, and in 1890 and 1891 specimens were sent to the Experimental Farms at Brandon, Manitoba, and at Indian Head, North-west Territories, to test their hardiness in those localities. These trees have been found quite hardy at both of these western Experimental Farms, and have started from the terminal buds on the branches every year since they were planted.

'As this was the only form of the apple which had proven hardy in the Canadian North-west, after several years experience had established its hardiness, a series of experiments were instituted to improve the size and quality of the fruit, which in its native form is not much larger than a cherry, and is often quite astringent. The trees, however, bear fruit abundantly.

'In the spring of 1894 this small wild crab was crossed with several varieties of hardy apples such as Tetofsky and Wealthy, also with some of the larger crabs, including Transcendent, Orange and Hyslop. The seeds obtained from these crosses were sown in the autumn of that year and germinated the following spring, producing in all about 160 thrifty young trees. These were planted the next year in a small orchard, in rows 5 feet apart each way. Some of them have grown very rapidly and have made shapely young

trees. During the past season (1899) 36 of these trees have fruited and some of them have borne heavy crops. The fact that so many of these cross-bred trees have fruited on the fourth year from the sowing of the seed is very encouraging and indicates a very early bearing habit. Of the 36 trees which have fruited this year, five have borne fruit of such size and quality as to justify their being named and propagated. Several others among those which have fruited are promising and will be further tested. Most of those of less promise have been dug up and destroyed, so as to give the remaining specimens more room. Following are the names and descriptions of the five varieties referred to, given in what is believed to be the order of their merit.

'*Charles.*—A cross of Tetofsky male on *Pyrus baccata* female. Tree a very upright and vigorous grower with large leathery leaves. The blossoms are deep pink in bud, pinkish white when open, large with wide petals. The fruit set well and the tree was fairly well laden, the fruit being distributed very evenly over the tree. It was ripe September 3, size $1\frac{3}{16}$th inches across, $1\frac{5}{16}$th inches deep, very distinctly ribbed. Colour a uniform yellow, very attractive. Flesh yellow, solid, crisp, juicy, mildly acid with a pleasant flavour, and slightly astringent. The skin is thin and the fruit bakes well. When compared with the Transcendent crab, the size was practically the same, and the acidity and astringency a little less; stem long, calyx persistent.

'*Novelty.*—A cross of Wealthy male on *Pyrus baccata* female. Tree fairly upright and a vigorous grower with good foliage. On this tree there were only a few bunches of blossoms, which were deep pink in bud, white when open, flowers large, petals broad. Fruit ripe September 19. Size, $1\frac{1}{2}$ inches across and $1\frac{1}{4}$ inches deep, smooth, colour deep red. Flesh a pale yellowish pink, firm, crisp and juicy, sub-acid and of fair quality. Stem long, calyx usually persistent; bakes well. The largest and best of the Wealthy crosses which have yet fruited.

'*Aurora.*—A cross of Tetofsky male on *Pyrus baccata* female. Tree a vigorous grower, upright in habit, leaves large, thick and leathery, blossomed freely. Flowers deep pink in bud, large when open and pure white, petals broad. The fruit set freely and was ripe September 11. Size $1\frac{7}{16}$ inches across, $1\frac{3}{16}$ inches deep. Colour bright red almost all over; very pretty; flesh crisp, juicy, acid and of fair flavour; astringency very slight. When baked this fruit is acid, but of good flavour. Stems long, calyx persistent.

'*Progress.*—A cross of Wealthy male on *Pyrus baccata* female. The tree is a vigorous grower and fairly upright in habit. It blossomed freely; the blossoms were deep pink in bud, pinkish white when open, flowers large, petals wide. Fruit ripe September 14. Size $1\frac{5}{16}$ inches across and $1\frac{3}{16}$ inches deep. Colour red, with some yellow and with a dark red cheek. Flesh very firm, crisp, sub-acid, juicy, astringency scarcely perceptible; of fair flavour. Stem long, calyx persistent.

'*Prairie Gem.*—A cross of Tetofsky male on *Pyrus baccata* female. This tree is a moderately vigorous grower, and rather spreading in habit. It was covered with blossoms, which were pink in bud, white when open, of medium size, with petals of medium width, and was covered with fruit from top to bottom. The fruit was ripe August 30. Size 1 inch across and 1 inch deep. Colour brilliant yellow and crimson. Flesh crisp, juicy, acid; flavour good, almost free from astringency; excellent for jelly. Deficient in size but promising for its earliness, quality and profuse bearing habit.

'All these varieties are remarkable for the persistent manner in which the fruit is attached to the tree. The stems are so firmly fastened that they re-

quire a considerable effort to detach them. The trees are all very strongly built with the branches bound to the trees with bands of woody fibre which are difficult to break. Root grafts were made of some of these varieties in the spring of 1898, chosen on account of their promising growth. A number of these were sent at that time to Brandon and Indian Head, and thirty-one specimens of twenty-two varieties survived the winter at Indian Head and had made fair growth by the close of the season in 1899. At Brandon seventy-four specimens of twenty-five varieties passed safely through the winter of 1898 and made fair growth in 1899. In both these collections the variety named Charles is represented, three trees of this apple survived at Brandon and two at Indian Head. A further supply of root grafts of promising sorts was sent last spring, and now that the fruit of the five varieties referred to has proven of value these will be propagated more freely and arrangements are in progress for testing them in many different parts of the North-west country. There is every reason to expect that they will prove generally hardy and that they will be highly appreciated. It is not expected that these new fruits will be much esteemed where larger fruits can be grown, but if they can be grown without special care or protection by farmers generally throughout the North-west country and the colder sections of Ontario and Quebec where the larger sized apples do not succeed, they will prove a great boon to the settlers in those districts, and furnish a wholesome and healthful addition to the food of the people.

'Since five good sorts have been found among the first thirty-six of these crosses which have fruited, it is probable that many other equally good or possibly superior sorts will occur among the many cross-bred trees,—about 270 now growing at Ottawa—which have not yet fruited.

'Another series of crosses have been made on a species of *Pyrus* known as *Pyrus prunifolia* and its hardiness has been established by a test of several years on both of the North-west experimental farms. The natural fruit of this species is nearly double the size of of *P. baccata*. The first crosses in this line were made in 1896, and some of the trees from this source are now two years old and are strong and vigorous in growth. The varieties of the different crosses with *Pyrus prunifolia* number about 200 in all, among which there will no doubt be many interesting sorts.

'The results reported are but the first steps in a series of experiments which are full of promise. As the more useful of these hybrids bear fruit the seeds of the finest specimens are being sown from which we may expect many interesting sports. Now that the continuity of nature has been broken by the work of cross-fertilizing, the method of selection will be brought to bear on the best of the seedlings, from some of which increase in size and improvement in quality of fruit may be looked for, and within a few years we shall doubtless have from these sources a considerable number of useful sorts of apples ripening at different periods in the season which will endure the climate of all the settled parts of the North-west country.'

### BUD-VARIETIES, SPORTS.

These are chance variations from the ordinary types which are sufficiently distinct to be regarded as different varieties. For instance, if the fruit on one branch of a tree which has not been grafted or budded is quite different from that on the others, it is a bud-variety. Bud-varieties may be propagated and perpetuated the same as other kinds.

## PROPAGATION BY GRAFTING AND BUDDING.

When a good variety has been originated, more trees of it are usually wanted, and the process of increasing the number is called propagation. Plants which come true from seed, are, as a rule, increased by growing them from the seed; but as a variety of apple cannot be reproduced in that way, other methods must be adopted, and recourse is had to grafting and budding. There are other methods of propagation, but these are what are usually adopted in this country. In grafting the apple, the name scion is given to a cutting of wood of the variety that it is desired to propagate. The stock is the tree or portion of the tree, be it young or old, that the scion is to be, or is, united with. As it is only through the stock that the scion can procure the sap which nourishes it, at least for a time, the former must be furnished with roots.

*Stocks.*—Some kinds of fruits may be grafted successfully on others which are closely related to them botanically, such as the pear on the quince; but there is nothing so satisfactory to graft the apple on as the apple, and, under certain circumstances, the crab apple.

Although the stock and scions are united by the process called grafting, both of them retain, almost entirely, their individual characteristics. The stock does, however, modify the vigour and fruitfulness of the variety grafted on it. If a variety is grafted on a dwarf or slower growing tree than itself the result is that the stock tends to dwarf it, as a sufficient quantity of crude sap does not pass through it to maintain the natural vigour of the top; and as a lessening in vigour tends to the development of fruit buds, this kind of stock is often used for the purpose of inducing fruitfulness in a variety and for dwarfing the tree. The Paradise stock of Europe is an example of this kind of stock. There is, however, often such a difference in the growth of the stock and the variety grafted on it that the result is not satisfactory. It is quite possible that the stock may have the effect of making the tree hardier, as if growth is checked the wood may ripen better. In top-grafted trees, great care should be taken that the stock is a vigorous growing variety, as, if it is not, the union may be bad, or the top outgrow it and the tree will become top heavy and finally break down. While good results have been obtained by top-grafting on crab apple stock, it is not very satisfactory and should not be used unless in exceptional cases, as the union is often bad or the grafted part outgrows the scion.

Dwarf or slow-growing stocks are not recommended for use in any but the coldest parts of the country. The stocks used in root grafting and budding in the districts where the best apples can be raised successfully are usually obtained from apple seeds which are procured at cider mills or anywhere else where they can be got easily and in large quantities, and no pains are taken to learn what varieties produced the seeds. Stocks grown from this kind of seed, while quite satisfactory, as a rule, are not desirable in the coldest parts of the country where root-killing is liable to occur, as individual trees vary much in hardiness, and one might graft a hardy variety on a tender stock without knowing it. At Ottawa, what stocks are required for root-grafting are usually grown from seeds of the Martha crab, which is a very hardy, vigorous sort. Seeds from the hardiest varieties of both apples and crab apples are more likely to produce hardy stocks than if the seeds were obtained promiscuously.

For the very coldest parts of Canada where the apple can be grown at all, the berried crab, *Pyrus baccata*, will probably make the most satisfactory stock for root-grafting or budding. It is perfectly hardy at Indian Head, N.W.T., where the winters are very severe, having endured the climate there. The seeds from which the stocks are to be grown for root-grafting or budding should be treated in the manner already described under the heading 'Seedling Varieties.' It is important to cultivate the young trees thoroughly the first season if it is desired to use them for root-grafting during the following winter. Only the strongest should be used for this purpose, and the others left to grow for another season, when they may be used for budding, if propagation is done that way, or for root-grafting as before. They will not be large enough for budding the first season. If it is known that a hardy variety is growing on its own roots, hardy stocks may be obtained if pieces of the roots are cut off and scions grafted on them.

There are many of the best apples which will not succeed in certain parts of Ontario and Quebec when grown in the ordinary way, as they are either root-killed, or sunscalded so badly that they die from the effect of it. Experiments conducted at the Central Experimental Farm go to prove that by top-grafting these varieties on hardy stocks some will grow well and produce fruit of fine appearance and quality. To obtain these stocks it is necessary, first of all, to have hardy roots. This may be effected to a large extent by raising seedlings from the very hardiest apples or crab apples. A variety is then grafted or budded on them, which forms a straight, clean trunk which does not sunscald, and on this variety is top grafted the kind that does not succeed when grown in the ordinary way. The surest way, however, of obtaining hardy stocks is to grow the hardy varieties on their own roots as explained in the paragraph on Root-grafting.

## SCIONS.

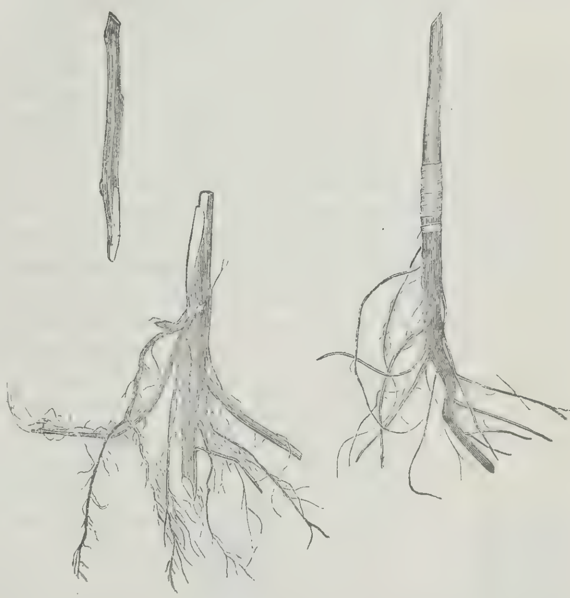
As much of the success in grafting depends on the condition and quality of the scions, too much stress cannot be laid on the importance of having them of the best quality and in the best condition at the time of grafting.

Scions may be cut any time after the wood is well ripened in the autumn and before the buds begins to swell in the spring. The best time, however, is in the autumn, as they may then be kept in the condition desired. If they are cut in cold weather, in winter, the trees from which they are taken may be injured if large numbers are removed from them, as the bark is liable to split, there is less sap also in the scions at that time and thus the chance of their drying up is greater than if they were cut in the autumn. One cannot tell very well, either, in winter whether the young wood has been injured or not. Scions should be cut from healthy, bearing trees. The wood of old trees is liable to be diseased, and if diseased wood is used it is likely to produce a diseased tree when grafted. Scions should also be cut from the most productive trees. Occasionally, one or more trees of a variety will produce more and heavier crops than the others. If scions are taken from these trees, the probability is that a larger proportion of the grafted trees will produce crops like the trees from which the scions were taken than they otherwise would. The scions should be cut from the wood of the current season's growth, as older wood is not satisfactory. The buds should be well developed and the wood thoroughly ripened. It is not wise to use the water sprouts or young shoots which spring from the main branches or trunk for this purpose.

They may not be thoroughly ripened, and it is also possible that sprouting propensities may be thus more developed in the grafted trees. The entire season's growth may be cut off and packed away until required for grafting, when it should be cut into pieces from four to six inches in length having three well developed buds.

Scions may be kept in good condition in moss, saw-dust, sand, or forest leaves. The last named are found very satisfactory at Ottawa. These materials should be slightly moist, but not wet; the object being to keep the scions fresh and plump without there being any danger of them rotting. They should be kept in a cool cellar which is not too dry, and should remain dormant until ready for use.

*Root-Grafting.* The cheapest and one of the best methods of propagating apples, especially in Canada, is by root-grafting. The strongest of the young stocks which have been grown in the manner already described are heeled in during the autumn in a cool cellar in moist sand. Grafting may be done any time during the winter, but it is usually not started until January or February. Whip or tongue grafting is the method usually employed. As only the root is required, the trunk and branches are cut off and thrown away. As there is but little advantage in using the whole root, it may be divided into several pieces, much depending on its size. Each piece should be at least four inches long. A smooth, sloping cut upwards, about two inches long, is made across the main part of the root most suitable to receive the scion. The scion is prepared by cutting off a piece of the wood procured for this purpose in the autumn from four to six inches long and with about three well developed buds on it; a smooth, sloping cut downwards and across it is now made of about the same length as that already made on the stock. Clefts are now made in the sloping surface of both scion and stock, in the former, upwards; and in the latter, downwards. They are then joined together by forcing the tongue of the scion into the cleft of the stock. The inner bark, or cambium, of both scion and stock should be in contact with one another on at least one side of the graft, as it is at this point of contact where the union begins to take place. In order to ensure a speedy and successful union, waxed cotton thread is wound tightly around to hold the parts together. Amateurs are also advised to rub grafting wax all over where the two parts are joined, as with this treatment success is likely to be more certain.



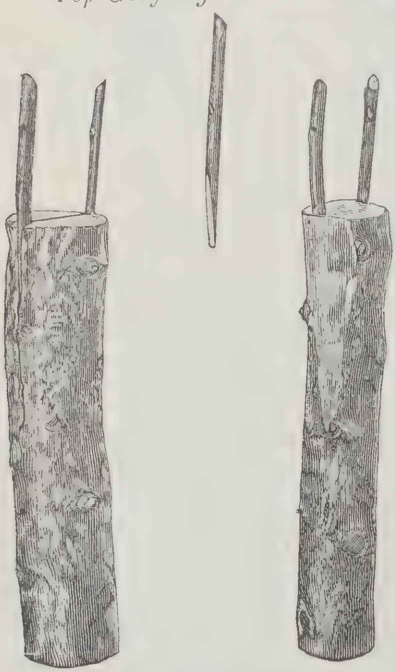
Example of Root-Grafting.

The operation having been completed, the grafts are packed away in moss or sawdust until spring. They are then planted out in nursery rows about

three feet apart and one foot apart in the rows, the point of union being about three inches below the surface of the soil. The ground should then be kept thoroughly cultivated throughout the season. Some varieties of apples throw out roots quite readily from the scion and after a time they thus become practically on their own roots. If it is desired to have a variety on its own roots, a scion from eight to twelve inches long may be used and the graft planted deep in the nursery row, only leaving one bud of the scion above the surface of the ground. Roots will then be thrown out on the scion, and when the tree is dug the stock may be cut away, and the tree will then be on its own roots. Or, on the other hand, a piece of root from a tree of the same variety as the scion may be used as the stock.

*Crown-Grafting.* Crown-grafting is usually done on young stocks in the nursery row in the spring. The trees are cut at or just beneath the surface of the soil at the crown or collar. A sloping cleft is then made in the side of the crown and a scion, cut wedge-shape at the lower end, is inserted in the cleft. The same precautions should be observed as in root-grafting, of having the inner bark of both stock and scion touching on at least one side. The grafted part should then be well covered with grafting wax, in order to exclude the air. The trees usually make a strong growth when grafted in this way, but as the work has to be done in April before growth begins it is often inconvenient to do it at that busy season of the year.

*Top-Grafting.* Where there are trees which produce poor or unprofitable fruit they may be made to bear good fruit by top-grafting other varieties upon them. If it is desired to grow a variety which, when grown in the ordinary way, proves a failure, on account of root-killing or sunscalding, it is possible to grow it successfully by top-grafting. Varieties which ordinarily take a long time to come into bearing will fruit much sooner when top-grafted. These are some of the most important results which may be obtained by this method.



Example of Cleft-Grafting.

Up to the present time in Canada, top-grafting has usually been done on old or bearing trees which produced poor fruit, and as very satisfactory results have been obtained this practice will continue to be popular.

The work is done in the spring before growth begins, but it is possible to graft successfully even when the trees are coming into leaf, provided the scion is quite dormant, but the chances of success are much lessened if it is done late. As the shock to a large tree would be very great if all or nearly all of the branches on which the leaves develop were cut off the first season, from three to four years should be devoted to removing the top of the tree. If, however, a large number of scions are inserted, the top may be changed in less time, but, as a rule, it is not wise to do it in less than three years. Furthermore, a too severe pruning at one time will cause a large number of shoots to grow on the tree, and considerable labour will be involved in removing them

if many trees are grafted. Cleft-grafting is usually adopted in top-working trees, it being a simple and satisfactory method.

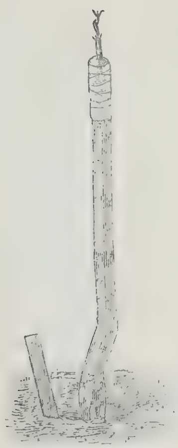
The branches to be grafted should not exceed an inch and a-half or two inches in diameter. If they are larger it is so long before the stub heals over that disease may set in. It is possible, however, to graft larger branches by putting in more scions, The top-grafting of a large tree should be done with a view to having the new top as symmetrical as possible, and great care should be taken in selecting the branches to be grafted upon. After the branch is sawn off it is cleft by means of a mallet and strong knife to the depth of an inch and a-half to two inches. It is held open to receive the scion by driving a wedge into it. Scions for use in top-grafting are cut from dormant wood which has been kept in good condition in the manner already described. They should have about three strong buds and be cut wedge-shape at the base, one side, however, being a little thicker than the other. Two scions are now inserted in the cleft of the stub, with the wide side of the wedge on the outside, and thrust down until the lowest bud is almost on a line with the edge of the stub. The inner bark of both scion and stub should meet at some point, so that the union will take place readily, and this is more easily effected if the scion is given a slightly outward slope when inserted. When the wedge has been withdrawn from the cleft the advantage of having the wedge-shaped end of the scion thicker on one side will be apparent, as it will be held much more tightly than if both sides were the same. If the scion is not a tight fit all along, there is something wrong in the way it has been cut or the stub has been cleft. The cut parts should now be covered with grafting wax to exclude the air and hold the scion in place. Cotton is also sometimes wrapped around the wax in order to more effectively hold the scion in place. If both of the scions grafted on a stub should grow, the weaker one should be removed after the other is well united and the surface of the stub at least partially healed over.

It is often desirable to top-graft young trees, and this may be done very readily. The main branches are cut back to within a short distance of the trunk, and the scions grafted on, either by cleft or whip grafting. The closer the grafted part is to the trunk, the better, as the tree will be stronger than if the union occurred further out on the limb, since the growth of graft and scion may not be equal. It is possible to cut off the whole top of the tree and graft successfully on the main trunk, when the tree is young, but unless one is sure that the union will be perfect and the top not outgrow the stock, it is better not to run the risk of losing the tree. Furthermore, if the whole top is cut off there will be such a growth the first season that the scions are liable to get broken off. In top-grafting a young tree that has been planted from three to five years, it is better to take two seasons to do the work, as the results will, as a rule, be more satisfactory.

It is necessary to examine the grafted trees during the summer and remove any young shoots from the stocks which are interfering with the scions. It is not wise, however, especially when the tree has been cut back severely for grafting, to remove all the shoots until the grafts have grown considerably and furnish a good leaf surface. In the chapter on stocks, reference was made to the top-grafting of tender varieties on hardy stocks, in order to make the former hardier. The trees should be double worked as described there, planted out in the orchard, and when large enough, which will be in two or three years, top-grafted with the tender sorts.

In 1896, trees of McMahon White, Gideon, Haas, and Hibernal apples were planted in the orchards at the Central Experimental Farm. These are

all very hardy, strong-growing varieties which do not sunscald at Ottawa and which are fine, straight-trunked trees. They were grafted on hardy roots. In 1898 the work of top-grafting these with varieties that are not perfectly hardy was begun, and up to the present time the following sorts have been grafted :—Baldwin, Belle de Boskoop, Benoni, Domine, Early Harvest, Esopus Spitzenburg, Fallawater, Keswick Codlin, King of Tompkins Co., Mother, Newtown Pippin, Northern Spy, Ontario, Rhode Island Greening, Rome Beauty, Sutton Beauty, Wagener, Winesap, and York Imperial. Few of these varieties can be grown successfully at Ottawa as standard trees. Top-grafted, they have already endured two winters and the terminal growth has not been injured. This work will be continued until all the best varieties of apples which are likely to grow here have been tested. The results of this experiment will be watched with much interest from year to year. To show the possibilities in this direction, it may be said that in 1891 a tree of Duchess and two trees of Wealthy were top-grafted with Northern Spy, which will not live at Ottawa when grown as a standard tree. All of these fruited in 1897. The grafts on Duchess produced fruit in 1897 and 1899, and those on Wealthy in 1897 and 1898. The wood of the Northern Spy appears quite hardy, and if the Duchess and Wealthy had been stronger growing stocks it is probable that good crops would have been produced for many years, but the Northern Spy is outgrowing the stocks and soon the trees will be so top heavy that they will likely break off in a severe storm. It is, then, not wise to top-graft a strong-growing variety on a weak-growing stock.



Young tree top-grafted on main stem.

Part of tree top-grafted.

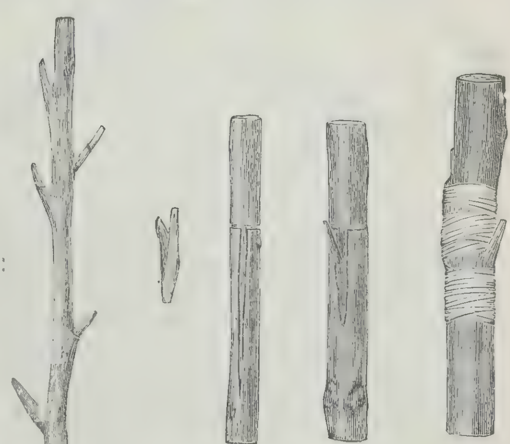
*Budding.* Although grafting is a much more common method of propagating apples than budding, the latter has some advantages over the former and can also be done at a time when grafting could not be performed successfully.

The best season for budding the apple is in late summer, some time during August being the best time for Ontario and Quebec. Young stocks of the second season's growth from seed are generally used. The process of budding adopted for apples consists in inserting a bud with very little or no wood, under the bark of the stock and on the surface of its wood. It is called shield-budding.

Budding is best performed when there is still sufficient sap beneath the bark to permit of the latter being easily raised with a knife. On the other hand, if the work is done when the tree is still growing vigorously the bud is liable to be 'drowned out,' or, in other words, forced out by reason of too much sap and growth of the stock.

The stock which is to receive the bud should be at least three-eighths of an inch in diameter near the ground. The lower leaves are rubbed off to a height of five or six inches to enable the budder to work more freely. A perpendicular cut is now made in the stock as near the ground as possible from an inch to an inch and a half long and preferably on the north side of the tree, as the bud will not be so readily dried out by the sun on that side. The cut should only extend through the bark. Another cut should now be made across the top of the perpendicular one. The two cuts when made will appear thus: ⊤

The buds are cut from well developed and ripened shoots of the current season's growth of the variety it is desired to propagate. Before the buds are removed the leaves should be cut off the shoots; a piece of the petiole or leaf stem is left, however, by which the bud may be handled after it has been removed. A very sharp, thin-bladed knife is necessary in removing the bud. Knives are specially made for this purpose. The bud is cut off the shoot downwards or upwards, whichever is more convenient, the general practice, however, is to cut upwards. The length of the piece removed with the bud should be about one inch long, and the cut surface smooth. It should be quite thin, as but little of the wood is taken with the bud. The buds or twigs should be kept where they will not dry out while the work of budding is going on. The bud is inserted under the bark by raising the latter with the blade of the knife or the part of the budding knife made for that purpose. The bud is then pushed down and under the bark with the fingers, and finally the piece of leaf stalk which was left when it was removed from the twig is pressed with the blade of the knife to bring the bud into the proper position. The bark on each side of the bud, which should now be under the bark of the stock will hold it in position. In order to bring the bud and stock into close contact



Example of shield-budding.

and prevent the former from drying up before the union takes place, they should be tied tightly together with raffia or some soft string, taking care not to cover the bud with it. The bud should unite with the stock in two or three weeks, and after that time the string should be cut, as otherwise the bud may be injured. If the proper season has been chosen for the work the bud should remain dormant until spring. If it starts in the autumn it may be killed during the winter. In the following spring the stock should be cut off just above the bud, which will cause all the strength of the stock to be directed into the bud and produce rapid growth, three feet not being an exceptional growth for the first season.

Budding is now a very popular method of propagating apples. The first season's growth is greater than from root-grafted trees and there is a larger proportion of straight trunked trees by this method. If it is desired also to prevent trees from becoming on their own roots, budding is preferable, as trees propagated in this way may be planted so that the stock is just at the surface of the soil and all roots are thrown from it.

### TOOLS AND APPLIANCES USED IN PRUNING AND GRAFTING.

Tools used by the fruit grower.

While grafting implements and appliances are numerous, the work can be done with a few, and as it is not often convenient for the farmer or fruit grower to get a large outfit, only the really necessary things are mentioned. These are:—A sharp, fine-toothed hand saw, to be used for sawing off large limbs, or for making the stubs on trees to be top-grafted where the limbs are too large to be cut with the pruning knife.

A strong pruning knife for cutting the smaller limbs; for smoothing the wounds made by the saw or pruning shears; for trimming off torn edges of branches, and for pruning roots of young trees when planting.

A budding knife, with a thin steel blade, for removing buds, having an ivory handle which is made thin at the end and is used for raising the bark.

A grafting knife, which is used in top-grafting trees. Home-made grafting knives can be easily made. A strong, sharp blade is the chief requisite.

Pruning shears, which are intermediate in their uses between the saw and the pruning knife. They are used for cutting off branches which are too large for the latter and too small to need the saw; for rough pruning and for cutting scions.

A wedge and mallet are also necessary in top-grafting large trees.

Raffia, which is one of the best tying materials. It is very strong and very pliable and is particularly useful for bandaging when budding.

Cotton yarn, which is used for tieing root grafts and is one of the most satisfactory materials for the purpose. The size known as No. 18 knitting cotton is the best. It is bought in balls, which should be soaked for a few minutes in melted grafting wax before using. The yarn may also be drawn through melted wax, which ensures its all being thoroughly soaked, and is, perhaps, on this account preferable to soaking the ball.

There are many kinds of grafting wax recommended, but it is unnecessary to enumerate them all. One of the cheapest and best is that recommended in *The Horticulturist's Rule Book*, under the name 'Reliable Wax,' the receipt of which is as follows:—

'Reliable Wax.—Resin, 4 parts, by weight; beeswax, 2 parts; tallow, 1 part. Melt together and pour into a pail of cold water. Then grease the hands and pull the wax until it is nearly white. One of the best waxes for either indoor or outdoor use.' This should be heated before using if too hard.

The principal value of grafting wax is to exclude air from the wound, and thus prevent the wood from drying before a union takes place. A good grafting wax should not crack when on the tree, else the air will reach the wound and the wax prove of little value. Many materials may be used instead of grafting wax for this purpose, one of the simplest being a mixture of clay and cow dung, but grafting wax is much to be preferred. Strips of cotton are often used, especially in top-grafting and crown-grafting, for wrapping around the wound after the wax has been applied for the purpose of helping to exclude the air, and also to assist in holding the scion in position until the union takes place. This cotton is unnecessary if good grafting wax is used; but if a very valuable variety is grafted it is safer to use the cotton, as when the growth of the scion is rapid there is a chance of its getting broken off during the first season before it is thoroughly united with the stock. Large wounds on trees should be covered with some material that will protect the cut surface from the weather, prevent disease from setting in, and which will not peel off easily. A good dressing of lead paint is probably the best material to use for this purpose. Grafting wax may be used on smaller branches.

## THE NURSERY.

Although, as a rule, it will be the most convenient plan to buy trees from the professional nurseryman, yet he who propagates apple trees by root grafting, crown grafting, or budding, for his own use, should have a nursery in which to grow them until they are ready for the orchard. A good sandy loam soil, which does not bake and is well drained, is best suited for this purpose, and will grow the strong, healthy trees which are desired. The ground should be thoroughly prepared and the young trees planted about 12 inches apart, in rows from 2½ to 3 feet apart. Cultivation should be thorough up to about the middle of July, when it should cease, as in colder climates, especially, it is very desirable that the wood ripen well, and late cultivation would encourage late growth. It will be necessary the first year the grafted or budded trees are growing in the nursery to go over them carefully and cut out any shoots which may be coming from the stocks, and also to reduce the graft to one stem should more develop. If any side branches grow, however, they should be left intact. In small nurseries it is sometimes advisable to tie the young trees to stakes the first season. This will make them straighter and will help to keep them from being broken. These trees may be planted in the orchard

the following spring if one-year old trees are to be used. By the end of the second year or the beginning of the third, after the branches have been pruned to the proper height and the tops shaped, the trees will be in the best condition for planting in the orchard.

### THE ORCHARD.

*Site and Soil.*—The farmer's orchard is, as a rule, near the house, and probably will be in the future, in most cases. There are many advantages in having it there which will offset the reason why it should not be. The man who makes fruit growing his main business, however, should consider well before deciding where he will plant his trees, so that good and profitable returns may be obtained. There has been much debate in recent years as to what slope is best suited for the apple. The trees planted on a southern or south-western slope are more subject to sunscald than if planted on a northern or eastern one. On the other hand it has been proven that in a very severe climate, trees suffer more from root killing on a northern slope, the intensity of the frost being greater. As sunscalding probably causes the death of more trees than root killing where the apple can be grown at all, and as root killing can be prevented to a large extent by growing cover crops, a northern or eastern slope would generally be best. It is not, however, necessary, to have the orchard on any slope, but sloping land is usually freer from early frosts and is better drained than level land, and good drainage is one of the chief essentials to successful apple growing. Good natural drainage is best, but if this cannot be had the soil should be thoroughly drained either with tiles or in some other way. Trees growing in badly drained soil will become stunted, diseased, short-lived and will rarely prove profitable.

The question of spring frosts should also be considered. All practical farmers and fruit-growers know that spring frosts are often very local, occurring on one part of a farm and not on the other. As these frosts sometimes mean much loss if they occur at the blossoming period, it is very important to avoid choosing a site where they are liable to do injury if another good site is available where frosts do not occur so often.

It is important, if possible, to have the orchard protected in some way from prevailing winds, and natural protection is an important factor in successful orcharding. The orchard can, however, be protected by planting windbreaks, reference to which is made elsewhere.

Apple trees grow well in almost any kind of soil if it is thoroughly drained. It is this adaptability of the apple which causes the trees to be planted frequently on poor land; but the better the soil, the better the results will be. A good orchard soil should, in the first place, be abundantly supplied with plant food in a form that may be made easily available. It should be rich in humus and should be easily worked, and if possible it should be of limestone formation. Sandy soil is easily worked, but is, as a rule, not rich in available plant food and is also lacking in humus. Plant food also which is applied in the form of barnyard manure and artificial fertilizers is easily leached away in sandy soil. In the colder parts of the country root-killing is also more prevalent in sandy soils. Clay land, on the other hand, is too stiff and is hard to work, the soil baking easily, and making it difficult to cultivate. Where, however, the ground is not kept cultivated and the fertility maintained by top dressing, trees are grown very successfully and good crops produced on this kind of land. The trees make less growth and on this account develop

more fruit buds than on light soils. Sandy loam and clay loam soils are, as a rule, the most suitable, and probably clay loam soils are the best for apple growing in the best apple-growing districts. Sandy loam soils are better further north, as they are warmer. Land which has been exhausted of much of its plant food by growing cereals or other crops upon it is less suitable for orchard purposes.

*Preparation of the Land.* It very often happens that the farmer or fruit grower suddenly decides to plant an orchard. No previous thought had been given to the matter, or if there had, nothing was done to get the land into better condition for the young trees. The trees are bought, the land hastily, and not very well, prepared and the trees set out to take their chances. No after cultivation will fully make up for neglect of the thorough preparation of the land. Trees should begin to grow thriftily from the time they are planted if they are to obtain a good size before they begin to bear heavily, and if the land is not thoroughly prepared and in good condition when they are planted, growth is likely to be slow. It is much better, if one has no land in good condition, to delay planting a year, and give the soil the necessary attention. The time will not be lost, as the trees will do much better. Land which has been well manured for root crops, ploughed in the autumn, and again ploughed in the spring and thoroughly levelled and pulverized with the harrow should be in good condition for planting the trees. If the subsoil is near the surface the subsoil plough should be used after the ordinary one, loosening the soil from four to six inches deeper than the former.

Sod land ploughed in the autumn, top dressed in the spring with a good coating of barn-yard manure and then ploughed again and thoroughly pulverized with the harrow, should also bring the soil into good condition. A green crop, such as clover ploughed under in the spring and the land thoroughly harrowed, would also be a very good method.

*Time of Planting.* Although trees may be planted successfully in the autumn, early spring is undoubtedly the best time. One of the few advantages of fall planting is that there is more time to do it then than in the spring. If trees are planted early in the autumn they will throw out some roots and be in a fair condition for standing the winter, but by the time the trees are ordered from the nurseryman and received, it is usually rather late, and if they are planted late the chances are that a large proportion will die, although this is not always the case. One cause of death appears to be that when the roots are not in close contact with the soil and the trees not well charged with sap, the trees dry out during the winter, and so die. It very often happens also that to begin with, the autumn is dry, and this makes the chances of success still less. It also often occurs, especially where the land has not been thoroughly prepared and only small holes dug for the trees, that rain, when it falls, does not escape from the holes. The water thus accumulated saturates the soil in the holes, freezes, and causes the trees to heave badly. If when this occurs it is overlooked and the trees not lowered in the spring, they may never thrive well. On the other hand, if trees are planted in the spring, the best conditions are afforded them for growing. They should, however, be planted in good season before growth begins and as soon after the ground is in condition to work as possible. As it is of the greatest importance to get the trees planted early and as, when ordered from nurserymen in the spring, it is difficult to get them as early as required, the best plan is to order them to be delivered in autumn and heel them in until spring, when they may be had as soon as required. A place should be chosen

for this purpose where the drainage is good, where there will not be danger from mice, and where the trees will be well covered with snow. A trench should be made deep enough to permit of the roots being well covered with soil. After cutting off any broken roots, the trees should be laid in a single layer in such a slanting position that the tops will almost touch the ground, and the roots and about half the trunk then well covered with soil, the latter being well worked in among the roots. If treated in this way they should come through the winter in good condition.

*Laying out the Orchard.*—The distance apart that apple trees should be planted will vary according to the varieties used, the locality, the land at the planter's disposal, and the other purposes, if any, for which he intends to use the land. In order to thrive best and produce fruit of good size and colour, the trees should have abundance of sun, light and air, and they cannot obtain these if planted too close together. Spraying has become such an integral part of successful fruit growing that sufficient space must be left between the trees to permit of doing this work thoroughly. When planted close, injurious insects and fungous diseases are more prevalent than where there is abundance of light and air. The only important advantage of close planting is the protection the trees afford each other, but it is only in the very coldest parts of the country where this protection is necessary, especially if low-headed trees are planted. The great mistake in the past has been that trees have been planted too close, the result being the production of poorly coloured, ill-shaped, and scabby fruit.

In the best apple growing districts most of the winter varieties should be planted from 33 to 40 feet apart each way. This seems a great distance when the trees are young, but they will continue to bear profitable crops for many years when trees planted much closer will have ceased to bear good fruit. A growing practice now-a-days, and one which is giving good satisfaction, is to plant what are called 'fillers' between the permanent trees. These are early, heavy-bearing varieties, such as Wealthy, Duchess and Wagener, which begin to produce profitable crops of fruit when very young, and which may be removed when they interfere with the permanent trees. Other fruits, such as plums, cherries and peaches, may also be used for this purpose. If, however, the permanent trees are planted less than 40 feet apart each way, the 'fillers' should only be planted between the trees in the permanent rows, as in a few years the trees would be too crowded for best results, and spraying could not be thoroughly done. When the distance apart at which the trees are to be planted has been decided upon, the orchard should be laid out, or, in other words, the places marked where the trees are to be planted. The rows of trees should be perfectly straight, both for the sake of easier cultivation and appearance. This may be easily accomplished if a little trouble is taken. If the field is irregular it is more difficult than if it is square. The places where the trees are to go should all be marked with stakes before the holes are dug, as it will be easier to keep the former in line if this is the case. The trees should be sighted both ways when placed in the holes.

*Windbreaks.*—If the orchard is not naturally protected from the wind by trees or by rising ground, a windbreak may be planted with good effect along the north and west sides, or any other side from which the greatest injury comes, the object being not to stop the wind altogether, but simply to check its velocity, as if a windbreak is high and very dense it stops the circulation of air in the orchard to a large extent, and this gives very favourable conditions

for the spread of both insect pests and plant diseases. On the other hand, a proper windbreak lessens the force of the wind and thus protects the trees, which will grow straighter and shapelier; it will also very materially lessen the amount of windfalls, and it will permit of growing varieties which will not succeed under ordinary exposure. Wind is one of the most important factors in drying out the land and causing drought. If its force is checked by a windbreak the evaporation of moisture from the soil will not be so great.

One of the best trees to plant for a windbreak is the Norway Spruce (*Picea excelsa*). It is a rapid growing evergreen and is hardy almost everywhere where apples can be grown successfully. A single row of these trees planted from eight to ten feet apart is quite sufficient. They should grow, if properly cared for, at the rate of from 2 to 3 feet a year until they reach a height of 50 to 60 feet. In very exposed places it may be desirable to plant two rows of trees, the trees forming the second row being planted between 8 or 10 feet behind the trees in the first row. The first row may be composed of Arbor-vitæ, which are rather slow growing, and the row behind made of Norway Spruce, if desirable. White pine and European larch are rapid growing trees which may be used for this purpose. Scotch pine is inclined to be irregular in growth, and is, on this account, sometimes not satisfactory. If the trees already mentioned cannot be obtained there are other native trees which will give good satisfaction.

*Kind of Trees to Plant* :—In the past, the popular tree was one with a trunk from five to six, and even, at times, seven feet high. The reasons why such trees were desired being that they enabled the planter to grow other crops nearer them than he could have done if the tops had been lower; they also enabled him to drive under the branches when working the land. The result, however, of training trees with such high trunks is that the apples are much more difficult to pick and the expense of picking them greater. When the trees are young the trunks are exposed to the sun, and sunscald is much more prevalent than it would be if there were less bare trunk and the head nearer the ground. These high headed trees are, however, gradually giving place to ones with less trunk, and from three to four feet is now considered the proper length by most of the best fruit growers. If trees of this kind are grown, the fruit can be much more easily picked, there is less trunk exposed to the sun, and the trees are stronger. There is also a less proportion of windfalls than from high headed trees, and it has also been found that proper cultivation can be given them at this height. If other crops are grown in the orchard they should take second place and trees should not be trained high on that account.



Two year old Apple Tree, marked for pruning.

Three year old low-headed Apple Tree.

In the colder parts of the country the best results will be had by starting the top within one to two feet from the ground, as the trees will be much

better protected than if the branches started higher up. It is possible that orchard culture, even in the best apple growing districts may be so modified in the future that it will be found that the best results will be obtained from trees branching out almost from the ground.

Two or three year old trees are, as a rule, the most satisfactory kind to plant, as when they are older than three years, growth is so checked and the trees so stunted by transplanting that it is not at all desirable to plant them when they are so old. Furthermore, the freight or express will be less on smaller trees. If low headed trees are desired they may be planted when one year old, if the growth is strong, and cut back to the desired height, leaving only the bare stem. The ordinary farmer, however, who may not give his trees much attention, requires a tree two or three years old, so that it may easily be seen if he grows other crops in the orchard. Trees should be procured from reliable nurserymen, as it is important to have them true to name and well shaped. A local nurseryman is best if he carries good stock. It will pay to get the highest grade of trees offered. Stunted, unshapely trees will never give the same results as healthy straight ones.

The two or three year old trees should have the heads well formed when received from the nurseryman. The best head consists of a central leader with three or four side branches rising alternately from the trunk. If the branches are opposite, a crotch is formed and when the tree is heavily laden a branch may be easily broken. It is not always possible to get a central leader, and the next best top is one with from three to five branches rising alternately from the main trunk, forming a symmetrical head.

*Planting:*—As many of the roots of apple trees are destroyed when they are dug, this should be taken into consideration when planting the tree, and the top headed in. If the top is not headed in there will not be enough sap from the roots which are left to support it, and the moisture transpired by the leaves being greater than the quantity supplied by the roots, the tree is liable to wither up and die. If the trees are grown by the person who plants them, great care should be taken in digging to destroy as few roots as possible. The amount of heading in will depend upon the number of roots and the condition of the tree. The branches should be cut back at least one-half and in the majority of cases it will pay to cut them back to about four buds. The work of heading in can be best done immediately after the trees are planted, as one can see better then what to do.

The "Stringfellow" method of planting trees has of late years been advocated by H. W. Stringfellow, of Texas. The theory of this method is that trees when transplanted in the ordinary way lose their tap root, but if the roots are pruned back to a mere stub a new tap root will be formed and the tree will be more permanent than when treated in the ordinary way. Trees pruned in this way would also be easier and more cheaply shipped, and make less labour in planting. To counterbalance the cutting off of the roots nothing is left of the top of the tree but a mere stub about eighteen inches long. While trees planted by this method may succeed under moist conditions of soil and climate, it is not a practice to be adopted in Canada where the soil and air are dry.

The roots of the trees should not be allowed to become dry from the time they are dug in the nursery or received from the nurseryman until they are planted. Much of the failure in planting comes through carelessness in this regard. When taking the trees to the orchard it is a wise precaution, especi-

ally if there are drying winds blowing, to puddle the roots in a thin mixture of loam and water, which will prevent, in a large measure, the small fibres from drying out. In addition to this, the roots should be protected until the trees are planted, by covering them with wet sacking or straw. Too much precaution cannot be taken in this matter. Before exposing the roots of the trees, however, the holes should be made. Many planters seem to have the idea that if they dig a hole barely large enough for the roots to be crowded into they will have good results. Sometimes they do; much oftener they do not. If the whole field has been subsoiled and is in a thorough state of tillage it would not matter so much, as the soil all over would be in the same state of friability, but this is very rarely the case. So that, as a rule, it is necessary to make the hole somewhat larger than will accommodate the roots, spread out to their full extent. It should be made about 18 inches deep, after which the subsoil should be loosened a few inches more, but not removed. In digging the hole, the surface soil should be kept separate from the subsoil or that of poorer quality. Sufficient surface soil should now be thrown back in the hole to make the tree, when planted, about an inch deeper in the ground than it was before. If a tree is not planted deep enough, the roots may become exposed and the tree die. On the other hand, it should not be planted too deep. Before it is planted permanently in the hole, the soil which has been thrown in should be raised and rounded off in the centre. If this is done, the roots of the tree can be spread out much more readily and placed more in their natural position. Roots of apple trees have not many fibres and it is necessary to spread what are left on the tree, carefully, in order to get the best results. Broken or bruised roots should be cut off before planting the tree.

The tree being now placed upright in the hole and the roots carefully spread out, the surface soil is gently thrown in and worked in among them, by the hand, if necessary. It is very important to have the soil come in close contact with the root fibres, in order that the best conditions may be afforded the tree to begin growth promptly. When the roots are well covered, more good soil should be thrown in and when the hole is about half full it should be well tramped with the feet, after which the hole should be filled level with the surface of the soil, tramping being done while it is being filled. The surface of the soil should be left loose, as this will help to prevent evaporation of moisture from the soil which has been thrown in. It is not necessary to water any tree if planting is done at the proper season and the soil fairly moist and well compacted about the roots.

If the orchard is in an exposed position and the trees large and with high trunks, it will pay to tie stakes to them to keep them from getting loose.

In districts where drought is liable to occur, or even in places where the soil is likely to become rather dry, it will be wise to mulch the trees to a depth of from 4 to 6 inches with manure, straw, sawdust, or anything of that nature which will not become a compact mass. If this is placed about the base of the tree and left during the summer it will keep the surface soil loose and prevent evaporation of moisture and the growth of the tree will be much more rapid. A good mulch may be the means of preventing a tree from dying if the season is very unfavourable or the tree in poor condition. If the mulch is loose when winter sets in there may be danger from mice, and this should be guarded against.

## VARIETIES.

The selection of varieties for planting is a very important factor in successful apple culture. There are now probably over 2,500 named kinds of apples. In 1892 it was found that 878 varieties were advertised by nurserymen in America alone.

Downing, in his great work, describes 1,856 kinds. At the Central Experimental Farm 645 varieties have been grown since 1887, while at the Experimental Farm at Agassiz, B.C., 1,217 have been tested. It will be seen, therefore, that the number of sorts from which to select is very large indeed. Of these there are a limited number of varieties which excel all the others in merit, and yet a smaller number which can be recommended for growing in the provinces of Ontario and Quebec.

With the experience which has been obtained at the Central Experimental Farm, with the large number of varieties which have been tested there, and with the information which has been obtained from prominent fruit growers in Ontario and Quebec, it has been possible to come to a fairly accurate conclusion as to the kinds which will be most likely to give the best results in the various parts of these provinces.

Before selecting varieties to plant it is necessary, first of all, to decide on what will be done with the fruit when the trees come into bearing. If there are near markets, where the apples can be sold to advantage, more of the earlier and perishable kinds may be planted ; but if the markets are already overstocked with such fruit, as they are in most places, varieties which will ship well should occupy the predominant place. After the proportion of summer, autumn and winter varieties has been settled, it is necessary to know which kinds representing these seasons are hardy, and which are productive and of good quality and well coloured. The following list of varieties which has been made after careful study, and the descriptions of most of them which follow, are given in order to afford this information to intending planters.

The provinces of Ontario and Quebec have been divided into thirteen districts (see map) numbered from 1 to 13, representing roughly the various climates of the two provinces, and the varieties which have been thought most suitable for these districts, are given under their respective numbers. The lines dividing the districts are by no means arbitrary. It is impossible to fix a line on one side of which one variety will succeed, and on the other on which another will do well. The boundaries are merely suggestive. It will also frequently happen that there will be particularly unfavourable orchard sites in a milder district on which it would be wiser to plant the varieties recommended for a colder one. The judgment of the planter will have to be exercised in such cases. Many varieties will be found to occur in nearly all the lists. There are in summer and autumn kinds, particularly, quite a number which appear to do equally well in various climates. The object has been to keep the number of varieties recommended as small as possible. One great objection which British buyers make to apples from Canada is that too many kinds are shipped by one individual, and there is no large quantity of any one sort. The shipper suffers in such cases. The reason that so many varieties are grown is that up to comparativaly recent years it was not known which kinds would succeed best, but now more accurate information may be obtained, and if a few of the best kinds are planted there will be more profit.

## A DISTRICT APPLE LIST FOR THE PROVINCES OF ONTARIO AND QUEBEC.

In the following lists of varieties recommended and suggested for the several districts marked off on the accompanying map, the summer and autumn kinds recommended are, as a rule, arranged in their order of maturing. The early winter and winter varieties are mostly arranged in descending order of merit from a profitable standpoint, but this arrangement is only suggestive. The order might be changed for different localities of the same district. Before planting an orchard, the owner should learn what varieties are proving most profitable in his vicinity.

The varieties which are merely suggested in these lists as worthy of trial are arranged in somewhat the same order.

Information which was obtained from prominent fruit growers regarding the best varieties of apples in their districts has been freely used in the preparations of this list:

### *District* 1.

Varieties recommended:—

Summer—Yellow Transparent, Red Astrachan, Duchess of Oldenburg.

Autumn—Gravenstein, Wealthy, Colvert, Twenty Ounce.

Early winter—Blenheim Pippin, Rhode Island Greening, Hubbardston Nonsuch.

Winter—Ontario, Baldwin, Ben Davis, Cranberry Pippin, Fallawater, Golden Russet.

Additional varieties suggested:—

Early winter—Ribston Pippin, Sutton Beauty.

Winter—Roxbury Russet, Rome Beauty, York Imperial.

Additional varieties suggested for home use:—

Winter—King of Tompkins Co., Northern Spy, Talman Sweet.

### *District* 2.

Varieties recommended:—

Summer—Yellow Transparent, Red Astrachan, Duchess of Oldenburg.

Autumn—Gravenstein, Wealthy.

Early winter—Blenheim Pippin, Ribston Pippin, Rhode Island Greening.

Winter—Ontario, Ben Davis, Cranberry Pippin, Baldwin, Golden Russet.

Additional varieties suggested:—

Autumn—Fanny, Colvert, Fall Pippin, Twenty Ounce.

Early winter—Fameuse (a late autumn variety in this district), Sutton Beauty.

Winter—Rome Beauty, York Imperial, American Pippin, Salome.

Additional varieties suggested for home use:—

Summer—Primate.

Autumn—Maiden's Blush, St. Lawrence.

Early winter—McIntosh Red (really a late autumn variety in this district), King of Tompkins Co., Princess Louise, Grimes' Golden.

Winter—Esopus Spitzenburg, Talman Sweet.

*District* 3.

Varieties recommended :—

Summer—Yellow Transparent, Red Astrachan, Primate, Duchess of Oldenburg.

Autumn—Wealthy, Gravenstein (preferably top-grafted), Alexander.

Early winter—Fameuse, McIntosh Red, Blenheim Pippin (preferably top grafted), Ribston Pippin.

Winter—Ontario, Northern Spy, Westfield Seek-no-Further, Ben Davis, Stark, Golden Russet.

Additional varieties suggested :—

Winter—Gano, Salome, Scott's Winter.

*District* 4.

Varieties recommended :—

Summer—Yellow Transparent, Red Astrachan, Primate, Duchess of Oldenburg.

Autumn—Gravenstein, Wealthy, Colvert, Twenty Ounce.

Early winter—Blenheim Pippin, King of Tompkins Co., Ribston Pippin, Hubbardston Nonsuch, Rhode Island Greening.

Winter—Ontario, Northern Spy, Baldwin, Ben Davis, Stark, Golden Russet.

Additional varieties suggested :—

Early winter—Fameuse, McIntosh Red, Wolf River, Sutton Beauty.

Winter—Rome Beauty, York Imperial, Cranberry Pippin.

Additional varieties suggested for home use:—

Autumn—St. Lawrence, Keswick Codlin.

Winter—Swayzie Pomme Grise, Esopus Spitzenburg.

*District* 5.

Varieties recommended :—

Summer—Yellow Transparent, Primate, Duchess of Oldenburg.

Autumn—Trenton, Gravenstein, Wealthy.

Early winter—Fameuse, Blenheim Pippin, Hubbardston Nonsuch.

Winter—Ontario, Northern Spy, Ben Davis, Stark, Cranberry Pippin, Baldwin.

Additional varieties suggested :—

Autumn—Alexander, Colvert.

Early winter—King of Tompkins Co., Sutton Beauty, Rhode Island Greening.

Winter—York Imperial, Rome Beauty, Westfield Seek-no-Further, Roxbury Russet.

*District* 6.

Varieties recommended :—

Summer—Yellow Transparent, Red Astrachan, Duchess of Oldenburg.

Autumn—St. Lawrence, Wealthy, Alexander.

Early winter—Fameuse, McIntosh Red, Scarlet Pippin, Wolf River.

Winter—Ontario, Stark, Scott's Winter, Gano, Ben Davis, Golden Russet.

Additional varieties suggested :—

Winter—Pewaukee, Red Canada, Milwaukee, Salome.

Additional varieties suggested for home use :—

Early winter—Grimes' Golden.

Winter—Swayzie Pomme Grise, Yellow Bellflower, Northern Spy (top grafted).

*District* 7.

Varieties recommended :—

Summer—Yellow Transparent, Red Astrachan, Duchess of Oldenburg, Montreal Strawberry.

Autumn—St. Lawrence, Wealthy, Alexander.

Early winter—McIntosh Red, Fameuse, Scarlet Pippin, Shiawassee Beauty, Wolf River.

Winter—Scott's Winter, Gano, Red Canada, Salome, Golden Russet, Pewaukee, Ben Davis, Canada Baldwin.

Additional varieties suggested :—

Summer—Tetofsky, Switzer, Charlamoff, Brockville Beauty.

Autumn—Peach of Montreal, McMahon White, Haas, Flat Aport.

Early winter—Baxter, Winter St. Lawrence.

Winter—Arctic, Milwaukee, La Victoire, Lawver, Stark.

Additional varieties suggested for home use :—

Summer—Lowland Raspberry, Russell.

Winter—Swayzie Pomme Grise, Pomme Grise, Yellow Bellflower, Northern Spy (top grafted), Talman Sweet.

*District* 8.

Varieties recommended :—

Summer—Yellow Transparent, Duchess of Oldenburg, Red Astrachan, Montreal Strawberry.

Autumn—St. Lawrence, Wealthy, Alexander.

Early winter—Fameuse, McIntosh Red, Wolf River.

Winter—Scott's Winter, Gano, Red Canada, Golden Russet, Canada Baldwin, Ben Davis, Pewaukee, Salome.

Additional varieties suggested :—

Summer—Tetofsky, Switzer, Charlamoff.

Autumn—Peach of Montreal, McMahon White, Haas.

Early winter—Baxter, Winter St. Lawrence.

Winter—Arctic, La Victoire, Stark, Lawver.

Additional varieties suggested for home use :—

Summer—Lowland Raspberry.

Early Winter—Grimes' Golden, King of Tompkins Co. (top grafted), Princess Louise.

Winter—Northern Spy (top grafted), Swayzie Pomme Grise, Pomme Grise, Talman Sweet.

*District* 9.

Varieties recommended :—

Summer—Yellow Transparent, Red Astrachan, Duchess of Oldenburg, Montreal Strawberry.

Autumn—St. Lawrence, Wealthy. Alexander.

Early winter—Fameuse, McIntosh Red, Wolf River.
Winter—Canada Baldwin, Scott's Winter, Red Canada, Pewaukee, Golden Russet, Salome, Gano, Ben Davis.

Additional varieties suggested :—
Summer—Tetofsky, Early Williams, Charlamoff.
Autumn—Peach of Montreal.
Early winter—Winter St. Lawrence.
Winter—Arctic, Bethel, Arabskoe (Winter Arabka).

Additional varieties suggested for home use :—
Summer—Lowland Raspberry.
Winter—Swayzie Pomme Grise, Pomme Grise.

*District* 10.

Varieties recommended :—
Summer—Tetofsky, Yellow Transparent, Red Astrachan, Duchess of Oldenburg, Charlamoff. The two latter being really autumn varieties in this district.
Autumn—Peach of Montreal, St. Lawrence, Wealthy, Alexander, Haas. The last three being early winter varieties in this district.
Early winter—Wealthy, Fameuse, McIntosh Red, Wolf River (a winter variety in this district).
Winter—Scott's Winter, Golden Russet, Canada Baldwin.

Additional varieties suggested :—
Autumn—McMahon White, Hibernal, Longfield, Antonovka. All of these are early winter varieties in this district.
Winter—Milwaukee, Salome.

*District* 11.

Varieties recommended :—
Summer—Tetofsky, Yellow Transparent, Red Astrachan, Duchess of Oldenburg, Charlamoff. The last two being autumn varieties in this district.
Autumn—St. Lawrence, Alexander, Wealthy, Longfield. The last two being early winter sorts in this district.
Early Winter—Fameuse.
Winter—Scott's Winter, Golden Russet.

Additional varieties suggested :—
Autumn—Hibernal, McMahon White, Patten's Greening, Antonovka. These are all early winter apples in this district. Whitney Crab is also suggested.
Early Winter—McIntosh Red, Wolf River ; the latter being a winter apple in this district.
Winter—Malinda, Milwaukee.

*District* 12.

Varieties recommended :—
Summer—Tetofsky, Yellow Transparent, Red Astrachan, Duchess of Oldenburg, Charlamoff. The two latter being autumn varieties in this district.
Autumn—Peach of Montreal, St. Lawrence, Wealthy, Alexander, Haas, Hibernal. The last four being early winter sorts in this district.

Early winter—Fameuse, McIntosh Red.
Winter—Scott's Winter, Golden Russet, Malinda.

Additional varieties suggested :—

Autumn—Antonovka, Longfield, Hibernal. Really early winter varieties in this district.
Early winter—Wolf River. A winter sort in this district.
Winter—Milwaukee.

*District* 13.

The most northerly district.

Varieties suggested :—

Summer—Tetofsky, Yellow Transparent, Duchess of Oldenburg, Charlamoff. The two latter being autumn varieties in this district.
Autumn—Whitney, Martha, and Transcendent crabs; also the hybrids between the Siberian crab and apple originated at the Central Experimental Farm; Wealthy, Hibernal, McMahon White, Longfield and Patten's Greening apples, all of which are early winter sorts in this district.
Early winter—McIntosh Red.
Winter—Scott's Winter, Malinda, Milwaukee, North-western Greening.

## DESCRIPTION OF VARIETIES.

The following varieties have been practically all described by the author from typical specimens either grown at the Central Experimental Farm or received from fruit-growers in the provinces of Ontario and Quebec. Nearly all the kinds recommended in the district lists will be found among them. They are divided into summer, autumn, early winter, and winter varieties and the names in each division are arranged alphabetically for ease of reference.

### SUMMER VARIETIES.

*Charlamoff* (*Pointed Pipka*, *Arabka*).—A Russian variety, grown under several different names in this country, the most common being Pointed Pipka and Arabka. Fruit above medium to large, oblong, conical; skin pale yellow well splashed and streaked with bright purplish red or carmine; a few small white, fairly distinct dots; cavity deep, and of medium width; stem of medium length, stout; basin shallow and of medium width, wrinkled; calyx open; flesh white, rather coarse, juicy, mildly subacid, with a pleasant flavour; core small; quality good; season, August, just before Duchess; tree very hardy, a spreading, strong grower and heavy bearer. The chief fault of this variety is that it only remains in good condition for a very short time. It is a good dessert apple when at its best. Does very well at Ottawa and further north.

*Duchess of Oldenburg* (New Brunswicker).—Originated in Russia. Fruit medium to large, roundish to oblate; skin yellow, well splashed and streaked with bright red; cavity of medium depth and width; stem short, moderately stout or rather slender; basin deep, open; calyx partly open; flesh white, crisp, tender, juicy, acid. Quality only above medium as a dessert fruit, but one of the best cookers; season, August, but will keep until

September further north ; tree very hardy, a moderate, spreading grower, and an early and very productive bearer. This variety was called the New Brunswicker in the Maritime Provinces some years ago, and it may still be found under that name there.

*Red Astrachan.*—According to Downing this was first imported into England from Sweden in 1816, and thence to America. Fruit medium to above medium in size, roundish, slightly conic ; skin pale green, almost covered with bright and deep crimson, very handsome ; dots few, pale, obscure ; cavity deep and of medium width ; stem of medium length, fairly stout ; basin shallow and of medium width, slightly wrinkled ; calyx open ; flesh white, firm, crisp, juicy, almost acid, with an agreeable rich flavour ; core small ; quality good ; season, latter part of July and first half of August ; tree hardy and an upright, strong grower, but inclined to be a shy bearer.

*Russell.*—Originated in Russell Co., Ontario. Fruit medium to above medium in size, roundish to oblate ; skin pale yellow, almost, or completely, covered with deep red ; dots few, gray, not prominent ; cavity shallow, open ; stem long, slender ; basin shallow, open, slightly wrinkled ; calyx closed ; flesh white, tender, melting, juicy, subacid, with a pleasant flavour, having a suggestion of Fameuse about it, slightly astringent ; core large, quality good ; season, middle of August to middle of September ; tree vigorous. Top grafted on Wealthy at the Central Experimental Farm it has produced good crops every other year. It ripens unevenly, making it more desirable for home use than for commercial purposes.

*Yellow Transparent.*—Originated in Russia, and was introduced in America in 1870 by the Department of Agriculture, Washington. Fruit medium to above medium in size, roundish, slight conical, slightly angular ; skin pale yellow ; dots fairly numerous, pale and rather obscure ; cavity deep, narrow ; stem of medium length, fairly stout ; basin narrow, shallow, slightly wrinkled ; calyx closed ; flesh white, firm, crisp, juicy, sprightly subacid, not high flavoured but pleasant ; core small ; quality good ; season, latter part of July and first two weeks of August ; tree an upright moderate grower, a good and early bearer and very hardy. The Yellow Transparent is the best apple of its season for the colder parts of Ontario and Quebec.

## AUTUMN VARIETIES.

*Alexander.*—Of Russian origin. Fruit very large, roundish, conical ; skin greenish yellow, well splashed and washed with deep red ; dots few, obscure ; cavity deep, and of medium width, russetted ; stem short, moderately stout ; basin deep, of medium width, almost smooth ; calyx large, open. Flesh yellowish, rather coarse, moderately juicy, subacid, with a pleasant flavour ; core medium size. Quality medium to above medium. Season late autumn. Tree hardy, vigorous, spreading and productive.

*Fanny.*—Originated near Strasburgh, Lancaster Co., Pa., U.S. Fruit above medium size, roundish to oblate, slightly conical ; skin yellow, heavily splashed and washed with deep red ; dots few, yellow and not prominent ; cavity deep, moderately open ; stem short, slender : basin of medium depth, narrow, almost smooth ; calyx partly open. Flesh white, crisp, tender, juicy, subacid ; core small ; quality good. Season September. Tree vigorous, spreading, productive.

*Gideon.*—Originated by Peter M. Gideon, Excelsior, Minn., U. S. Fruit above medium size to large, roundish conical, ribbed; skin yellow with a bright rosy red blush; dots fairly numerous, yellow, distinct; cavity narrow, medium depth; stem short to medium, slender; basin shallow and of medium width, wrinkled, calyx closed; flesh white, crisp, juicy, brisk subacid, liable to water-core; core large; quality above medium; season October and early November; tree very hardy, a strong grower and moderately productive.

*Gravenstein.*—Originated in Germany. Fruit large to very large, roundish; skin yellow, splashed and streaked with orange and red; stem short, stout; basin wide and rather deep. Flesh tender, crisp, juicy, subacid and very high flavoured; quality very good; season September and October. Tree a strong, spreading grower and very productive.

*Haas* (*Fall Queen*).—Originated near St. Louis, Mo. Fruit medium to above medium in size; oblate; skin yellow, well splashed and washed with deep, sometimes brownish red: cavity deep; moderately open; stem short, stout; basin narrow, of medium depth, almost smooth. Flesh white, juicy, subacid, with little characteristic flavour, rather astringent; core small; quality medium to above medium. Season autumn. Tree hardy, a strong, upright grower and a good annual bearer. Not desirable except in the coldest parts of the apple growing districts.

*Hibernal* (*Romna*).—Originated in Russia. Fruit above medium to large, oblate conical; skin pale greenish yellow, splashed and streaked on sunny side with bright purplish red; a few white dots; cavity deep, of medium width, russetted; stem short, stout; basin of medium depth and width, slightly wrinkled: calyx open. Flesh yellowish, crisp, tender, juicy, acid; core small; quality above medium; season September to November. Tree very hardy, a strong, spreading grower, and very productive. Although not a good dessert fruit this is a fine cooking apple and on account of its great hardiness and productiveness is one of the best of the Russian apples.

*Longfield.*—A Russian variety introduced in the year 1870. Fruit sometimes medium, mostly below medium in size, roundish conical, slightly angular; skin pale yellow, almost white, with a bright pink blush; dots few, obscure; cavity very narrow, deep, more or less russetted; stem short, slender; basin narrow, of medium depth, wrinkled; calyx partly open; flesh white, crisp, very juicy, very tender, melting, brisk subacid, almost acid, pleasant; core medium; quality good; season October and November; tree very hardy, a moderate grower, spreading, pendulous, a very heavy bearer. Owing to the great crops, the fruit is liable to be undersized, and because of its tender flesh and pale skin, it shows bruises badly, which lessens its commercial value and is against it. It is a good apple for the north on account of its hardiness and low growth.

*McMahon White.*—Introduced by A. L. Hatch, Wis., U.S. Fruit large to very large, roundish, slightly conical; skin pale waxy yellow, almost white when in best condition, with a delicate pink blush; cavity deep, open, slightly russetted; stem short, stout; basin of medium depth, narrow, almost smooth; calyx open; flesh white, rather coarse, crisp, juicy, brisk subacid; quality above medium. An excellent cooking apple. Season October and November. Tree a very strong grower and a good cropper. Trees planted in the spring of 1888 are now bearing from 2½ to 3 barrels each. Owing to its vigour and apparent great hardiness it should be one of the best apples to plant near the limits of successful apple culture.

*Twenty Ounce* (*Cayuga Red Streak*).—Originated in Connecticut, U.S. Fruit large to very large, roundish; skin yellow, splashed and streaked with bright purplish red; cavity deep and wide; stem short and stout; basin of medium depth, calyx small, open; flesh white, coarse, juicy and briskly subacid; quality above medium, but a first-class cooking apple; season late autumn to early winter. Tree a strong grower and productive.

*Wealthy*.—Originated by Peter M. Gideon, Excelsior, Minn., U.S. Fruit of medium size, almost large on young trees, roundish; skin yellow, well splashed and washed and sometimes completely covered with crimson; dots yellow, fairly numerous, distinct, but not prominent; cavity deep and of medium width; stem short to medium, slender; basin narrow, rather deep, almost smooth; calyx partly open; flesh yellowish sometimes tinged with red, crisp, tender, juicy, briskly subacid with a pleasant aromatic flavour; core small; quality good to very good; season September to November, and later in some parts of the provinces; tree spreading, a medium grower and an early and heavy bearer. This is another apple which is hard to excel in its season.

EARLY WINTER VARIETIES.

*Blenheim Pippin*.—Originated at Woodstock, Oxfordshire, England. Fruit large, oblate; skin golden yellow, well washed and splashed with orange red mostly on the sunny side; dots few, pale, distinct but not prominent; cavity moderately deep, narrow, russetted; stem short, moderately stout; basin of medium depth, smooth, open; calyx large, open; flesh yellow, crisp, tender, melting, moderately juicy, mildly subacid, of good flavour; core small; quality good to very good. Season November and December. Tree a strong grower and a good bearer.

*Fameuse* (Snow).—Origin unknown. Supposed either to have been brought to Canada with the early French settlers or to have been a seedling originated in this country. Fruit of medium size, roundish to oblate; skin pale yellow, either almost or completely covered with deep red or splashed and washed with red when fruit is not well coloured; dots not prominent; cavity of medium depth and width; stem short to medium in length, slender or moderately stout; basin small, somewhat narrow, almost smooth; flesh very white, very tender, juicy, subacid with a fine flavour and a delicate perfume; core small; quality very good to best; season early winter; tree a strong grower, spreading, and a heavy bearer. This is one of the best dessert apples and one of the most profitable where it succeeds well.

*Hubbardston Nonsuch*.—Originated at Hubbardston, Mass., U.S. Fruit above medium to large, roundish to oblong, conical; skin yellow, splashed and washed with orange red and purplish red; dots fairly numerous, gray, distinct, but not prominent; cavity deep, narrow, russetted; stem short, slender; basin narrow of medium depth, slightly wrinkled; calyx open; flesh yellowish, crisp, very tender, melting, juicy, mildly subacid, with a pleasant flavour; core small; quality very good. Season early winter. Tree a strong, spreading grower and a good bearer.

*King of Tompkins Co.*—Origin uncertain; said to have originated in New Jersey. Fruit large, roundish, somewhat oblate, obscurely angular; skin yellow, well splashed and washed with bright crimson and orange red; dots fairly numerous, white, distinct, prominent; cavity of medium depth and width; stem short, moderately stout; basin of medium depth and width,

almost smooth; calyx closed; flesh yellow, rather coarse, crisp, tender, melting, moderately juicy with a rich, high, aromatic and very agreeable flavour; core small; quality very good to best; season early winter; tree a strong, spreading grower, but an uncertain cropper, the crops being usually light.

*McIntosh Red.*—Originated with John McIntosh, Dundela, Ont. Fruit above medium to large, roundish, slightly angular, highly perfumed; skin pale yellow, almost entirely covered with crimson, dark on sunny side and brighter on rest of fruit; dots few, small, yellow, distinct but not prominent; cavity of medium depth and width; stem short, stout; basin narrow, almost smooth, medium depth; calyx partly open; flesh white, crisp, very tender, melting, juicy, subacid, sprightly with a pleasant aromatic flavour; core of medium size; quality very good to best; season November to January; tree hardy, and a strong, moderately upright grower and an annual and medium bearer. For its season the McIntosh Red apple is one of the best varieties grown. It is said to be very subject to scab in some places, but this has not been the experience at the Central Experimental Farm. It has also not been found to be a shy bearer as reported by some.

*Rhode Island Greening.*—Originated on Rhode Island. Fruit large, oblate to roundish; skin green, often with a light, pink blush; dots numerous, pale or gray, distinct, but not very prominent; cavity narrow and of medium depth; stem short, moderately stout; basin narrow, shallow, slightly wrinkled; flesh yellow, crisp, tender, juicy, subacid, rich, slightly aromatic; core of medium size; quality very good. Season early winter to midwinter. Tree a spreading very strong grower and a heavy bearer. This variety is quite subject to scab and needs thorough spraying. It also lacks high colour, which is against it as an export apple.

*Scarlet Pippin* (*Leeds Beauty*).—Originated at Lyn, Leeds Co., Ontario, near Brockville. Mr. Harold Jones, Maitland, Ont., has had most to do in bringing this fine apple before the public. Fruit of medium size, oblate to roundish; skin yellow, waxy, more or less washed and splashed with bright and dark crimson, and covered with a light bloom; cavity deep and of medium width; stem short, slender; basin narrow, shallow, almost smooth; calyx generally closed; flesh white, firm, crisp, tender, melting, juicy, a mild subacid, with a pleasant but not high flavour; core small; quality very good; season early winter. A very attractive looking apple and said to sell better than Fameuse, which it does not, however, equal in quality. Tree a strong, upright grower, and said to be a heavy bearer.

*Shiawassee Beauty.*—Originated in Shiawassee Co., Mich., U.S. Probably a seedling of Fameuse. Fruit of medium size, oblate, flattened; skin yellow, well washed and splashed with deep crimson; dots few, pale, distinct; cavity deep, open; stem of medium length, slender; basin medium in depth and width, and almost smooth; calyx closed or open. Flesh white, crisp, tender, juicy, mildly subacid with a good flavour; core medium. Quality very good. Season early winter. Tree a hardy, strong, moderately upright grower, and a heavy bearer in alternate years.

*Sutton Beauty.*—Originated at Sutton, Mass., U.S. Fruit of medium size, roundish conic; skin waxen yellow, washed and splashed with crimson; dots fairly numerous, pale, distinct; cavity of medium depth, narrow; stem of medium length, moderately stout; basin medium in depth and width, slightly wrinkled; calyx of medium size, open or partly open; flesh dull white, crisp, firm, juicy, a sprightly subacid with a pleasant but not high flavour; core

small; quality good. Season midwinter. Tree an upright, strong grower and productive.

*Winter St. Lawrence.*—Imported in 1833 from Manchester, England, under the name of Mank's Codling, by the late Wm. Lunn, of Montreal. Named Winter St. Lawrence by the Montreal Horticultural Society about 1873. Fruit medium to large, roundish, slightly conical; skin greenish yellow well covered with deep red through which are dark purple splashes and streaks; dots fairly numerous, pale, distinct; cavity rather deep and medium in width; stem short, slender; basin narrow, almost smooth, of medium depth; calyx partly open, sometimes closed. Flesh white, rather soft, melting, moderately juicy, subacid, good flavour; core small; quality good; season, early winter. Tree a moderately spreading, strong grower and apparently very hardy. A shy but annual bearer at Ottawa.

*Wolf River.*—Originated with W. A. Springer, near Wolf River, Fremont, Wis., U.S., and disposed of to H. Riflen before coming into bearing. It is supposed to be a seedling of Alexander. Fruit large to very large, oblate conic, slightly angular; skin greenish yellow, becoming lighter later in the season, nearly covered with a dark red or crimson, with a few pale, distinct dots; cavity deep and of medium width, russetted; stem short, slender; basin narrow and of medium depth; calyx closed or open; flesh yellowish, moderately juicy, rather tender, subacid with a pleasant flavour; core of medium size; quality above medium; season, early to midwinter; tree hardy and a strong, spreading grower and a good cropper in alternate years.

### WINTER VARIETIES.

*American Golden Russet.*—Origin uncertain. Fruit medium to above medium in size, roundish; skin greenish yellow, more or less russetted sometimes with bronzed blush; dots obscure; flesh greenish yellow, juicy, subacid with a high rich flavour; core medium; quality good to very good; season, late winter; tree a strong, upright grower sometimes but a light cropper. This is a valuable variety in the colder parts of Ontario and Quebec, as it is very hardy.

*American Pippin.*—Origin uncertain. Fruit medium to large, roundish; greenish yellow with a pink or orange blush or lightly splashed with same; dots fairly numerous, distinct but not prominent; cavity deep, medium in width, sometimes slightly russetted; stem short and stout; basin rather deep, medium in width and slightly wrinkled; calyx large, open; flesh yellow, firm, crisp, juicy, subacid; core small; quality good. Season late winter. Tree a vigorous spreading grower and productive. An exceptionally good keeping apple.

*Baldwin.*—Originated in Massachusetts, U.S. Fruit above medium to large, roundish; skin yellow, well washed and splashed with crimson and red; dots fairly numerous, gray, distinct; cavity of medium depth and width; stem short and stout; basin deep, open, somewhat wrinkled, calyx closed or open; flesh yellowish, firm, rather coarse, moderately juicy, mildly subacid, with a pleasant flavour; core small; quality good; season, late winter; tree moderately upright, vigorous and productive. Has been a very profitable variety in the past on account of its productiveness, appearance and good shipping qualities.

*Ben Davis.*—Originated in North Carolina early in the 19th century. Fruit medium to large, roundish conical; skin yellow, well splashed and

streaked with red; dots obscure; cavity deep, of medium width, slightly russetted; stem short, slender; basin of medium depth and width, wrinkled; calyx open; flesh dull white, firm, moderately juicy, mildly subacid, but has no characteristic flavour; core medium; quality medium; season late winter; tree hardy, spreading, vigorous and very productive.

*Bethel.*—Originated in Vermont. Fruit large, roundish, slightly angular; skin greenish yellow, splashed and streaked with carmine; dots numerous, greenish yellow, prominent; cavity deep, of medium width, slightly russetted; stem short, slender; basin shallow, narrow, smooth; calyx partly open; flesh whitish with traces of pink, juicy, mildly subacid; core of medium size; quality good; season, midwinter to late winter; tree a strong grower.

*Canada Baldwin.*—Said to have originated from seed of Pomme de Fer on the farm of Alexis Dery, St. Hilaire, Que. It was given its name by N. C. Fisk, Abbotsford, Que., who propagated it in 1855. Fruit of medium size, roundish to slightly oblate; skin yellow, well washed, splashed and streaked with bright red and crimson; dots fairly numerous, large, yellow, prominent; cavity deep, open; stem short to medium in length, slender; basin medium in depth and width, slightly wrinkled; caylx closed or partly open; flesh white, tinged with red almost to the core, rather coarse, firm, inclined to be corky, fairly juicy, mildly subacid, with a pleasant flavour, slightly astringent; core small; quality good; season midwinter; tree an upright, strong grower; a shy but annual bearer at Ottawa; said to be subject to sunscald, but trees have not suffered much from it here.

*Cranberry Pippin.*—Originated near Hudson, N.Y. Fruit large, roundish; skin yellow, splashed, streaked and washed, especially on the sunny side, with bright purplish red; dots fairly numerous, small, gray, not prominent; flesh white, crisp, moderately juicy, rather coarse, subacid, flavour not very marked; core small; quality medium; season, early winter to midwinter; tree a very strong, spreading grower and productive.

*Esopus Spitzenburg.*—Originated on the Hudson River. Fruit medium to above medium in size, oblong, tapering, angular; skin yellow, nearly covered with bright rich red which is darker on the sunny side; dots numerous, yellow, prominent; cavity deep and narrow; stem short, moderately stout; basin narrow, of medium depth, wrinkled; calyx of medium size, partly open; flesh yellow, crisp, tender, juicy, subacid with a rich high flavour; core of medium size; quality very good to best; season early to midwinter; tree a poor grower of moderately spreading habit and usually a light bearer, which lessens its value for commercial purposes, though one of the best for home use.

*Fallawater.*—Originated in Pennsylvania. Fruit large to very large, roundish; skin yellowish green washed with pink or dull red, mostly on the sunny side; dots few, pale, large and prominent on the red portion of skin; cavity narrow, of medium depth, slightly russetted; stem short, rather slender; basin narrow, of medium depth, slightly wrinkled; calyx partly or fully open; flesh greenish yellow, crisp, tender, juicy, mildly subacid, with a pleasant flavour; core small; quality good; season, midwinter to late winter; tree a strong grower and a good bearer.

*Gano.*—Originated in Missouri and is said to be a seedling of Ben Davis. Fruit above medium size, roundish conical; skin yellow, almost completely overspread with crimson, not splashed or streaked as Ben Davis; dots gray, obscure; cavity of medium depth and width; stem short; basin of medium

depth and width, slightly wrinkled; calyx open. Flesh dull white, somewhat tenderer than Ben Davis, moderately juicy, mildly subacid, has no characteristic flavour; core medium; quality medium; but little, if any, better than Ben Davis; season late winter. Tree a hardy, upright, strong grower and an annual and good bearer. This is a very handsome apple, being more highly coloured than Ben Davis, as grown at Ottawa.

*La Victoire.*—Originated near Grenville, Que. Probably a seedling of Fameuse. Fruit above medium size, oblate, regular; skin greenish yellow, almost covered with crimson; dots fairly numerous, gray, distinct; cavity of medium depth and width, slightly russetted; stem short and stout; basin of medium depth and width, almost smooth; calyx open and medium in size; flesh white, tinged with red, rather coarse, moderately juicy, mildly subacid, with a pleasant flavour; core small; quality good; season midwinter; tree hardy and a strong, moderately spreading grower. This variety has not, so far proved very productive, but is a handsome apple, and on account of its season and hardiness will probably prove useful in the north.

*Lawver* (*Delaware Red Winter*).—Origin uncertain. Fruit above medium size, roundish to oblate, somewhat angular; skin yellow, nearly all, or quite, covered with bright to deep red; dots few, pale, distinct; cavity medium in depth, narrow; stem long and slender; basin very shallow, narrow, wrinkled; calyx small and closed; flesh yellow, faintly tinged with pink, firm, crisp, tender, juicy, sprightly subacid, slightly aromatic; core small; quality above medium; season late winter; tree, hardy, vigorous, moderately upright. An annual bearer but not a heavy cropper. This is an exceptionally good keeper. The fruit may be kept for a year in an ordinary cellar without difficulty.

*Mann.*—Originated in New York State. Fruit above medium to large, oblate; skin very green in early winter changing to yellow when fully ripe, often with a brownish pink blush; dots numerous, pale, and quite prominent in early winter; cavity deep, medium in width, russetted; stem short, slender; basin of medium depth and width, slightly wrinkled; calyx partly or fully open. Flesh yellow, crisp, juicy, mildly subacid, with a pleasant flavour. quality good; season late winter. Tree a vigorous, spreading grower and an early and heavy bearer. A good keeping apple but lacks attractive colour.

*Milwaukee.*—A seedling of Duchess which originated in Wisconsin. Fruit large, oblate, slightly angular; skin pale yellow well splashed and washed with bright red and crimson; dots few, small, white, not prominent; cavity deep and of medium width, slightly russetted; stem short, moderately stout; basin deep, open, slightly wrinkled; calyx open. Flesh yellowish, crisp, very tender, juicy, acid with but little characteristic flavour; core small. Quality above medium; season December to March. Tree spreading, a moderate grower and an early and good cropper. A promising apple for the north, as it appears to be very hardy.

*Northern Spy.*—Originated near Rochester, N.Y., U.S. Fruit large to very large, roundish conical, slighly angular; skin yellow, usually well washed, splashed and streaked with pinkish red, which in highly coloured specimens becomes bright red; there is also a pale bloom which increases the attractiveness of this variety; dots few, small, yellow; cavity deep, open; stem short, moderately stout; basin of medium depth, narrow, slightly wrinkled; calyx small, closed or open; flesh creamy white, crisp, tender, juicy, subacid, sprightly, aromatic, of a good flavour; core rather large; quality very good to best; season midwinter to late winter. Tree

an upright, strong grower and yields good crops in alternate years, when it comes into bearing, but it is usually from twelve to fifteen years before full crops are produced.

*Ontario.*—Originated by the late Charles Arnold, by crossing Wagener with Northern Spy. Fruit large to very large, oblate, sometimes roundish, slightly angular; skin yellow, usually well washed and splashed with bright red and carmine, there is also a pale pink bloom which adds to the appearance of this variety; dots few, pale and a little larger and more distinct than on the Northern Spy; cavity deep, open, slightly russetted; stem short, moderately stout; basin medium to rather deep, slightly wrinkled; calyx small, open or closed; flesh creamy white, crisp, tender, juicy, a brisk subacid (more acid than Northern Spy), sprightly, slightly aromatic; core small; quality very good; season midwinter to late winter. Tree moderately vigorous, but an early and heavy bearer. One of the best apples, both for commercial purposes and for home use.

*Red Canada.*—Origin unknown. Fruit medium to large, oblate, slightly conical; skin yellow, well splashed and washed with deep, rather dull red; dots fairly numerous, large, yellow, prominent; cavity deep, narrow; stem short, slender; basin narrow, shallow, slightly wrinkled; calyx small, partly open; flesh yellowish, tender, moderately juicy, mildly subacid with a pleasant but not high flavour; core of medium size; quality good; season midwinter to late winter. Tree a strong grower and has proved productive in some places, while a shy bearer in others.

*Roxbury Russet.*—Originated in the State of Massachusetts and is thought by many to be the same as the Nonpareil of Nova Scotia. Fruit above medium to large, oblate, conic, slightly angular; skin greenish yellow, more or less russetted, sometimes with a bronze blush; dots obscure; cavity of medium depth, open; stem short, stout; basin of medium depth and width, smooth, calyx open or closed; flesh yellowish, tender, moderately juicy, subacid, with a good, rich flavour; core small; quality very good; season midwinter to late winter; tree moderately vigorous, spreading and a good cropper.

*Salome.*—Originated with Elias C. Hathaway, Ottawa, Ill., U.S. Fruit medium to below medium in size, roundish conical, somewhat angular and inclined to be irregular; skin pale yellow, splashed and washed with bright and sometimes rather pale red, overspread with a delicate pink bloom making the fruit very attractive looking; dots numerous, pale yellow, prominent; cavity deep and medium in width; stem short, moderately stout; basin narrow, medium in depth, almost smooth; calyx small, closed or partly open; flesh yellow, crisp, tender, moderately juicy, subacid, slightly aromatic; core large; quality good; season midwinter to late winter; tree a strong, upright grower, hardy and a good cropper. When the crop is large the fruit is liable to run below medium in size. This is a handsome apple and being hardy and a good keeper is valuable in the colder parts of the country.

*Scott's Winter.*—Introduced by Dr. F. H. Hoskins, Newport, Vt., U.S. Fruit medium to below medium in size, roundish conical, angular; skin yellow, well splashed and washed with deep orange and purplish red; dots obscure; cavity of medium depth and width, slightly russetted at base; stem short, moderately stout; basin deep, rather narrow, slightly wrinkled; calyx partly open; flesh yellowish, crisp, tender, juicy, acid but with a pleasant flavour; core medium; quality above medium, almost good; season late winter. Tree, very hardy and a strong, upright grower. An annual bearer and a good cropper.

*Stark.*—Origin not known. Fruit large, roundish, slightly angular; skin greenish yellow when in good condition, more or less splashed and washed with brownish pink, mostly on the sunny side; dots not prominent; cavity of medium depth and width; stem short, moderately stout; basin of medium width, rather shallow; calyx large, partly open or open; flesh yellow, moderately juicy, rather coarse, mild subacid, pleasant but not high flavoured; core medium; quality almost good; season late winter. Tree a strong, moderately spreading grower. This has proved a light cropper at the Central Experimental Farm, but is reported to be a good bearer elsewhere. The trees here, however, have only been planted since 1891.

*Swayzie Pomme Grise.*—Supposed to have originated near Niagara, Ont. Fruit below medium, sometimes almost medium in size, oblate to roundish; skin yellow covered with a thin russet nearly all over; dots fairly numerous, pale, distinct but not prominent; cavity deep, narrow; stem short, slender; basin narrow, of medium depth, almost smooth; calyx partly open; flesh pale greenish yellow, crisp, breaking, tender, juicy, sprightly subacid with a high aromatic flavour; core small; quality very good to best; season midwinter; tree hardy and an upright but only moderate grower and rather light cropper. A fine dessert apple.

*Talman Sweet.*—Originated on Rhode Island. Fruit medium to above medium in size, roundish; skin yellow when fully matured with often a faint blush on the sunny side; a distinct line usually runs from stem to calyx; dots few, gray, not prominent; cavity open, medium in depth; stem rather long, slender; basin medium in depth and width, wrinkled; calyx open; flesh white, firm, moderately juicy, sweet, with a high flavour; core small; quality very good for a sweet apple; season early winter to late winter. Tree a strong, spreading grower and very productive.

*Wagener.*—Originated in the State of New York. Fruit medium to above medium in size, oblate; skin yellow, well washed and streaked with crimson; dots pale, distinct; cavity wide, deep; stem medium length, slender; basin medium in depth, wrinkled; flesh yellowish, crisp, very tender, juicy, briskly subacid, pleasant flavour; quality very good to best; season midwinter. Tree an upright and moderate grower and an early and heavy bearer.

*Westfield Seek-no-Further.*—Origin, Connecticut, U.S. Fruit of medium size, roundish conical; skin yellow, well washed and splashed with deep red; dots numerous, large, yellow, distinct, prominent; cavity deep, narrow, russetted; stem short, moderately stout; basin narrow, shallow, smooth; calyx open; flesh yellow, tender, melting, juicy, mild subacid, with a pleasant flavour; core above medium in size; quality very good; season midwinter. Tree vigorous and productive.

*Yellow Bellflower.*—Originated in Burlington, N.J., U.S. Fruit large, oblong conical; skin pale yellow, often with a pinkish or orange blush on the sunny side; dots few, gray, prominent; cavity of medium depth and width; stem of medium length, moderately stout; basin narrow, shallow to medium, wrinkled; calyx closed or partly open; flesh yellow, tender, buttery, juicy, subacid, with a pleasant flavour; core large; quality good; season midwinter. Tree a spreading, moderate grower, and productive.

*York Imperial.*—Supposed to have originated in York Co., Pa., U.S. Fruit of medium size, oblate, flattened and somewhat one sided, angular; skin yellow, splashed and washed with bright red; dots few, yellow, distinct,

but not prominent; flesh yellowish, firm, crisp, tender, moderately juicy, mildly subacid with but a slight characteristic flavour; quality above medium; season late winter. Tree a moderate grower, but productive. A very popular commercial apple in some parts of the United States.

### RUSSIAN APPLES.

When the Russian apples were first introduced into Canada it was thought that they would prove a great acquisition, especially in those parts where the climate was severe. Most of the varieties, of which a large number were imported, have proved to be of inferior quality, and as almost all of them are early apples, their usefulness has been necessarily limited. There are, however, a few of them which are very valuable, and, being hardier than most varieties of American origin, are useful to those who live near the extreme limits of successful apple culture. As far north as Ottawa, however, which is about latitude 45°, many apples of American origin succeed well, and these are, in most cases, preferable to the Russian. North of latitude 45° the Russian apples increase in value the further north they are grown. The Yellow Transparent and Duchess of Oldenburg apples are exceptions to almost all the others, these being standard varieties in all parts of Canada where apple trees are grown.

A large number of Russian apples have now been tested for twelve years at the Central Experimental Farm. In the year 1888 there were planted in the orchards 133 supposed varieties. Since that time others have been added at intervals, and, notwithstanding those which have been winter-killed, there are now about 160 varieties, though some of these may be synonyms, as a number of synonyms have already been discovered.

A few of the trees planted in 1888 fruited in 1890. The trees did well and made vigorous growth up to the year 1892, when blight appeared in the orchard and did considerable injury, and in 1893 the disease appeared earlier in the season and committed great ravages among the trees. This left the orchard in a very bad condition. Some trees had died altogether, others were reduced to stumps, and again others which had large diseased limbs sawn off had lost their symmetry. The trees were not so much affected in 1894 and 1895, but owing to the severity of the winter of 1895–6 a large number were root-killed. Further injury from root killing occurred during the winter 1896–7. During the past three seasons the trees have been replaced and have made good growth, and many of those which were affected by blight are regaining symmetrical proportions.

The most promising varieties are recommended in the district lists and described elsewhere in this bulletin.

The following case for and against the Russian apples, which was published by Prof. F. A. Waugh, in Bulletin No. 61, of the Vermont Agricultural Experiment Station, so fully expresses our own opinion of them that it is endorsed, and herewith quoted :—

#### FOR.

'They have given us several varieties of recognized value, like Oldenburg and Yellow Transparent.

'They promise to give us other useful varieties through gradual intercrossing with our common apples.

'They furnish hardy trunks on which more tender varieties may be grafted to advantage.

'The trees are very hardy.

'They are mostly free from disease (except blight).

'They usually bear early and abundantly.

'The fruit is often large and finely coloured.

'Their introduction has encouraged many persons to grow apples in regions where they would not otherwise have attempted it.

AGAINST.

'Very many of the varieties introduced are immensely worthless.

'Most of them ripen too early and will not keep. This is due to their introduction from a zone of shorter season to one of longer seasons.

'The fruit of many varieties drops badly before mature.

'The fruit is usually coarse grained and of poor quality.

'The skin is often very thin and tender, making the fruit liable to injury.

'Their nomenclature is so badly confused that no one can be sure of what he is handling.

'The young growth is extremely subject to "fire blight."

POLLINATION OF APPLES.

It is now known that the cause of the unproductiveness of some varieties of apples when planted in large blocks by themselves is often due to either complete or partial self-sterility of the blossoms. It has also been found that varieties self-sterile in themselves will, if planted near each other, be cross-fertilized, if the two varieties bloom at the same time, and fruit will set on both kinds As it has been found that a variety which is self-sterile in one locality is not necessarily so in another, it is impossible to give an accurate or complete list of those which are self-sterile and those which fertilize themselves. The relative blossoming periods of the different varieties of apples, however, are fairly regular in the provinces of Ontario and Quebec, and by planting those kinds which bloom about the same time it is not absolutely necessary to know whether a variety is self-sterile or not. For five years, observations on the dates of blossoming of varieties of apples were made by persons in various parts of Canada for the Horticultural Division of the Central Experimental Farm. The data thus accumulated have been compiled and it is now possible to give the following list of apples divided into three groups, according to their average time of blooming. While this division may not hold good in all parts of Canada; it will be found to be fairly correct on the whole.

EARLY GROUP.

Antonovka, Duchess of Oldenburg, Early Harvest, Fameuse, Gravenstein, Gideon, Haas, Hurlbut, Longfield, Patten's Greening, Red Astrachan, Scott's Winter, Shiawassee Beauty, Tetofsky, Wagener, Scarlet Pippin—16 varieties.

MEDIUM GROUP.

Alexander, Baldwin, Baxter, Ben Davis, Blenheim Pippin, Canada Baldwin, Esopus Spitzenburg, Fallawater, Fall Jenetting, Gano, Golden

Russet (American), Hubbardston Nonsuch, Jonathan, Keswick Codlin, King of Tompkins Co., McIntosh Red, McMahon White, Magog Red Streak, Maiden's Blush, Malinda, Mann, Newtown Pippin, Peach, Pewaukee, Pomme Grise, Primate, Princess Louise, Rhode Island Greening, Roxbury Russet, St. Lawrence, Salome, Stark, Swaar, Swayzie Pomme Grise, Wealthy, Winter St. Lawrence, Wolf River, Yellow Transparent, Ontario, Ribston Pippin, Colvert, Brockville Beauty—42 varieties.

### LATE GROUP.

Blue Pearmain, Cranberry Pippin, Grimes' Golden, Lawver, Northern Spy, Red Canada, Talman Sweet, Walbridge, Westfield Seek-no-Further, Yellow Bellflower—10 varieties.

### PRUNING.

There are several objects in pruning trees, the principal being the production of well coloured fruit of good size, in paying quantities, and the maintaining of a symmetrical top and well balanced tree to bear this fruit. Trees will bear fruit without pruning, but it is small in size and not so attractive. Unpruned trees, also, are likely to bear heavily one year and have no crop the next. Pruning lessens the number of apples produced and the tree not being so much exhausted at one time is likely to bear more regularly. It does not exhaust a tree as much to bear a good crop of fine fruit as it does to produce a heavy crop of small fruit, as the exhaustion of the tree is in proportion to the number of seeds matured, and not to the size of the fruit.

Low headed apple tree unpruned.

Low headed apple tree pruned.

Trees should be pruned regularly, beginning when they are young. If much pruning is done at one time it would be likely to injure the tree.

When the trees begin to grow thriftily many new branches will be formed, and it is the work of the pruner to remove all those which are not necessary and to cut back others. The top of the tree should be kept open, to admit air and sunlight, but pruning should be so carefully done that there will be no bare limbs. All branches which are growing across and through the top should be cut out. If two branches touch one another, one of them should be removed. If a branch on one side of the tree has outgrown the other, it should be headed back so as to make the tree symmetrical, cutting it off just above a bud which is on the side that it is desired to have the new growth. If, when the trees are young, they are treated in this way every year, comparatively little work will have to be done at one time. The best time to prune is between the middle of May and the middle of June when the trees are growing thriftily, as the wounds will heal over quicker if done at that time, but as this is a very busy season of the year the customary practice is to prune during the month of March, when quite satisfactory results are obtained. By pinching off young growth, which is not required, in summer, labour will be saved in pruning. It is much better to prune at any time of the year than to neglect it altogether, as it is not a matter of great consequence what month it is done in. The tools used should be a sharp pruning knife and a fine saw ; the branch should be cut off close to the limb or trunk from which it is removed and the cut should be as clean and smooth as possible. A bad practice in pruning, and a very common one, is to leave the stub remaining of the branch cut off. In many cases this never grows over, rot sets in and reaches the heart of the tree, and eventually ruins it. A clean, close cut will heal quickly and needs no paint or wax, unless a large limb has been removed.

Unfortunately, too many of our farmers and fruit growers neglect pruning their trees regularly, the result being that when they do begin, it is necessary to remove many large limbs. In cases of this kind it is not wise to do too much pruning in one season, as a severe pruning of the tree will cause so much young growth that it will be necessary to thin it out It will also expose the limbs which have been protected, and may cause sunscald. A better practice is to do it regularly. If large limbs are removed, the wounds should be given a coating of lead paint, which will protect them from weather and prevent rot from setting in until they begin to heal over.

It is a well known fact that winter or spring pruning tends to the production of wood ; and summer pruning, to the production of fruit buds. The reason of this is that pruning before growth begins, or when it is beginning, destroys the balance between top and root, and there being then more sap supplied by the roots than the remaining top can elaborate, stronger growth is made or new branches formed to re-adjust this balance. If pruning or pinching off part of the new growth is done in the summer after most of the growth has been made, a part of the elaborated sap, which is as necessary to the production of strong roots as it is to the production of top, is removed, and the tree is checked in its growth and weakened, although the pruning should not be so severe as to make the latter apparent. A weakening of this kind tends to the development of fruit buds. Summer pruning to produce fruitfulness is, however, seldom necessary, and it is not recommended. If trees are given even a fair measure of attention they will reward the owner with abundant crops. Some varieties of apples do not come into bearing as quickly as others and often growers think that something is wrong with these trees when they

do not bear early. Root pruning, which also tends to weaken the trees and promote favourable conditions for the development of fruit buds, is sometimes advocated, but this, likewise, is seldom necessary. This is done by digging around the trees, and thus destroying part of their roots.

A branch which is broken or split by the wind or by weight of fruit may often be saved if it is carefully bent back to as near its original position as possible and bolted with an iron bolt. An auger hole is made through the broken branch and the uninjured part and a bolt run through. By doing the work carefully, the branch may be drawn almost into its original position by tightening the nut well. The bolt should be as near the size of the auger hole as possible, as the tighter the fit the better. The nut and end of the bolt are better large, as they will not sink so readily into the wood. After the bolting is done the ends of the auger hole should be closed up with grafting wax or paint, as the bolt will not fit tightly enough to exclude air, and germs of disease may enter. If the split or break is a bad one the branch should be headed back, so as to lessen the leaf surface. Although a branch may often be saved by treating it in this manner, a better practice is to bolt the trees before the branch breaks. A weak branch is often indicated by a splitting at the crotch, and if the bolt is run through then the branch is almost certain to be saved. It is sometimes advisable to brace the tree higher up, and this can be done with a longer bolt.

Patching up trees is not, however, on the whole a very satisfactory practice, and it may be avoided to a large extent by having trees without crotches, and this may in a large measure be accomplished by pruning the trees properly when young.

Trees are often ruined by neglecting to treat wounds or allowing rot to set in at the crotch. In such cases all the decayed part should be removed and the wood scraped back to living tissue, and in the case of rough wounds made by bruises or breaking of limbs, the edge and surface should be trimmed until quite smooth, so that healing may begin rapidly. These should now be painted, or, if not painted, sprayed with Bordeaux mixture to destroy germs of disease, and then covered with paint or grafting wax. Wounds should be kept covered with these substances until they are healing nicely.

### MAINTENANCE OF FERTILITY.

When it is at all possible, it is much better not to remove any crops but apples from the orchard land after the trees are planted. When it is considered that the apple trees are to bear crops for fifty years or more on the same land, it may easily be understood that the trees to do their best will need all the plant food that they can get from the soil, and as much more as can be economically applied. If the soil is cropped with grass, cereals and roots, for instance, for eight or ten years, much plant food will be removed, and although these crops may be manured there is but a small percentage of people who will manure the land sufficiently to make up for the plant food removed. Furthermore, the moisture in the soil is lessened if other crops are grown, owing to the evaporation from the leaves of the growing crops, and as droughts now occur so frequently in some parts of the country, as much moisture as possible should be conserved for the use of the young trees. If other crops must be grown, they should be such as may be cultivated or hoed. Corn, although an exhausting crop, is one of the least objectionable crops to grow, as

it shades the trunks of the young trees. If other crops such as hay or grain are grown there should be four or five feet left on each side of the tree without any, and the strip thus left may be cultivated. If no other crops are grown in the orchard, the trees, if cultivated properly, will need very little manure until they come into bearing, as apple trees will grow quite thriftily when young on comparatively poor soil, as the exhaustion of the soil from the production of wood is small compared with that when large crops of fruit are removed.

Barn-yard manure is one of the best complete fertilizers where it can be procured cheaply and conveniently.

The weight of the fertilizing constituents which are removed from the soil in the production of a crop of apples when the trees are in full bearing has been estimated by careful analyses, and if about fifteen tons of fresh barn-yard manure were applied every three years, considerably more plant food would be restored to the soil than would be removed by the crops of apples. But as some of it will leach away and some never be reached by the feeding roots of the trees, it is wise to give a liberal dressing.

As in many places barn-yard manure cannot be profitably used because of its scarcity, the following extract from the report of Mr. F. T. Shutt, Chemist of the Dominion Experimental Farms, for 1894, will prove valuable to those who desire to maintain the fertility of their land by other methods than the application of barn-yard manure :—

## 'COMPOSITION OF THE FRUIT.'

### *Analysis of Apples.*

'The general composition, viz., the percentage of water, organic matter and ash (which make up the whole) and the amount of nitrogen, are given for the four varieties examined in the following tabulated form :—

| Name of Variety of Apple. | Water. | Organic Matter. | Ash. | Nitrogen. |
|---|---|---|---|---|
| Duchess of Oldenburg. | 88·61 | 11·14 | ·25 | ·0382 |
| Wealthy | 87·00 | 12·71 | ·29 | ·0375 |
| Fameuse | 85·22 | 14·46 | ·32 | ·0512 |
| Northern Spy | 87·08 | 12·65 | ·27 | ·0445 |
| Average | 86·98 | 12·74 | ·28 | ·0428 |

Although there is a great similarity in composition in the varieties examined, and none differ much from the average deduced from them all, it is of interest to note that the Fameuse is the richest in organic matter, in ash constituents and in nitrogen. The Wealthy and Northern Spy contain almost identical amounts of organic matter and ash, and the Duchess of Oldenburg has the largest percentage of water and lowest percentage of organic matter and ash.

'PERCENTAGES OF IMPORTANT CONSTITUENTS IN ASH.'

| Name of Variety of Apple. | Phosphoric Acid. | Potash. | Soda. | Oxide of Iron. | Lime. | Magnesia. | Silica. |
|---|---|---|---|---|---|---|---|
| Duchess of Oldenburg...... | 8·90 | 53·67 | 3·28 | 1·77 | 5·80 | 5·20 | ·36 |
| Wealthy.................... | 8·15 | 57·00 | 2·65 | 1·76 | 3·33 | 3·84 | ·63 |
| Fameuse.................... | 7·19 | 56·25 | 2·56 | 1·26 | 3·55 | 4·03 | ·32 |
| Northern Spy.............. | 11·68 | 54·11 | 1·94 | 2·13 | 3·86 | 3·99 | 1·11 |
| Average............... | 8·98 | 55·26 | 2·61 | 1·72 | 4·38 | 4·27 | ·60 |

In this table the composition of the ash in detail is given. Of its components, phosphoric acid and potash are the principal. The latter constitutes over half of the ash (55·26 per cent), while the former is about 9 per cent, the average being 8·98 per cent.

No great differences between the varieties are here to be noticed, though the Northern Spy presents some striking variations from the average. Its ash contains nearly 3 per cent more phosphoric acid, nearly 1 per cent less soda, about ·5 per cent more oxide of iron and alumina, and about ·5 per cent more silica than the ash of the other apples.

The ratio of the potash to the phosphoric acid in the ash of the fruit is 6 to 1; in the ash of the older leaves it is 2 to 1. Relatively, therefore, the demands of the leaf and the fruit on the soil of these two constituents are very different. It might here be remarked that the greater quantity of the ash ingredients of the fruit is contained in the seeds and walls of the ovary, comparatively little being found in the flesh of the apple.

A comparison of this table with that showing the composition of the ash of the leaf, will reveal further interesting features. The total percentages of ash in similar weights of leaf and fruit, are as 3·46 to ·28. Lime is much more abundant in the ash of the leaf, while magnesia, oxide of iron and silica are about the same, taking the older leaves for comparison.

For the purpose of a practical presentation of the subject, the data presented in the following table have been prepared :

'WEIGHT of Important Fertilizing Constituents withdrawn from the soil.'

| Name of Variety of Apple. | Average weight per bushel in pounds. | Nitrogen. | | Phosphoric Acid. | | Potash. | |
|---|---|---|---|---|---|---|---|
| | | Lbs. per barrel. | Lbs. per acre, or 160 barrels. | Lbs. per barrel. | Lbs. per acre, or 160 barrels. | Lbs. per barrel. | Lbs. per acre, or 160 barrels. |
| Duchess of Oldenburg...... | 44 | ·046 | 7·359 | ·027 | 4·307 | ·162 | 25·975 |
| Wealthy ................ | 50 | ·057 | 8·220 | ·032 | 5·181 | ·226 | 36·232 |
| Fameuse .................. | 50 | ·070 | 11·223 | ·031 | 5·043 | ·256 | 39·456 |
| Northern Spy ............. | 46 | ·056 | 9·006 | ·039 | 6·383 | ·185 | 29·570 |
| Average.......... | 47·5 | ·057 | 8·952 | ·032 | 5·228 | ·217 | 32·808 |

NOTE.—In the above calculations the following data are used: Forty trees per acre in an orchard twenty-five years old yield, on an average, one hundred and sixty (160) barrels. One barrel contains two bushels and three pecks.

We have here the number of pounds of nitrogen, phosphoric acid and potash estimated as contained in one barrel of the fruit, and the amounts removed per acre by a good crop. None of the quantities are at all excessive, and the cost of returning them would not be great. The largest demand is on the potash in the soil; next comes the nitrogen, and lastly the phosphoric acid. In the case of the leaves, the nitrogen stood first.

For the vigorous development of the tree and an abundant crop of fruit, the soil must contain these constituents in a more or less *immediately available condition.* It is for this reason, as well as to replace the exhausted plant food, that fertilizers are necessary to profitable apple growing.

*Nitrogen.*—To supply nitrogen, some organic manure is perhaps the most economical. Barnyard manure or the turning under a leguminous crop (the latter being rich in nitrogen) are to be recommended. Besides adding nitrogen, they furnish humus or decaying vegetable matter, which serves a useful function by liberating carbonic acid, and which in turn sets free locked-up forms of mineral food. Humus, moreover, has much to do in bringing about good tilth and in the retention of soil moisture. As the period of growth and fruit development in the apple is comparatively long, organic manures in most instances will probably give better returns than those containing more soluble forms of nitrogen, such as nitrate of soda or sulphate of ammonia.

*Potash and Phosphoric Acid.*—To furnish potash and phosphoric acid, we would first mention wood ashes. In most parts of Canada they are the cheapest form in which to purchase these constituents. Moreover, they possess them in the relative proportion best suited to tree requirements and in a condition that renders them easily available.

If wood ashes are not obtainable, kainit and muriate of potash may be substituted to supply potash; and bone meal and superphosphate, the phosphoric acid. Bone meal contains 2 per cent to 3 per cent of nitrogen, in addition to the phosphoric acid, but requires a greater length of time in the ground to give up its constituents; its effects naturally last longer. For this very reason it is often advocated for orchard fertilization.

Both wood ashes and bone meal furnish lime, which we have seen to be a necessary and somewhat important element.

Soils differ so much in composition that it is impossible to state definitely the amounts of these fertilizers that should be employed in all cases. The wants of the tree for fruit and leaves have been given and the principles for an economical return of these requirements indicated. In conclusion, it may be said that the best and most profitable crops can be obtained only when the soil contains what might be thought to be a large amount of plant food, the greater part of which is more or less assimilable. A good tilth, among other advantages, tends to a good root development. In such the rootlets are able to procure food from a much larger area than otherwise; but in every orchard, owing to the disposition of the roots, there must of necessity be much unoccupied soil, and hence the importance of supplying liberally and in excess of that which is absolutely needed for a season's growth and fruit, those forms of plant food which we have been considering.'

Leaves in proportion to their weight contain a much larger amount of plant food than the fruit. The amount contained in 1,000 pounds of leaves

gathered in September was 8·87 pounds of nitrogen, 1·94 pounds of phosphoric acid, 3·92 pounds of potash, this being the average of five varieties analysed by Mr. Shutt.

### CULTIVATION.

Of late years, orchard cultivation and management have received the serious attention of all progressive fruit growers. The droughts, which appear to be getting more prevalent in certain parts of Canada, have led to the adoption of methods which are more conducive to the conservation of moisture. The plant food, also, which is in the soil, is made more easily available by the tillage which many orchards now receive.

Shall we keep our orchards in sod or adopt clean cultivation? This is the question asked time and again at meetings of farmers and fruit growers, and something is to be said in favour of both methods, though, as a rule, and under most conditions, clean cultivation with cover crops will give the best results.

Many good crops of apples have been grown in orchards which are in sod. In fact, until recent years, comparatively few orchards were kept cultivated. If the soil is good and the trees never suffer from lack of moisture, and are in a thriving condition, it will not be necessary to cultivate. But how few orchards there are in which the trees do not suffer from drought when in sod, and where they thrive as well as they would if the land were cultivated! If grass is growing in the orchard a very large amount of moisture will be transpired through its leaves and the soil being thus deprived of it will be much drier, and the apple trees will suffer. Rain, which falls during summer showers, will often not soak through the sod, as it will be evaporated before it does so. When a thick sod is formed in the orchard the air does not penetrate as freely and the plant food, which requires the action of air to make it available for the use of the tree, will not become available so readily.

In the colder parts of the country where the apple will grow, however, the best plan will probably be to keep the orchard in sod, as the roots will be much better protected from frost. There will also not be as much growth as if the ground were kept cultivated and the wood on this account will be better ripened and more prepared to withstand the winter.

Cultivation of the soil in orchards offers such great advantages over non-cultivation that in the best apple growing districts it is unquestionably the better practice to adopt in most cases. When the surface soil is cultivated it forms a mulch and prevents the evaporation of moisture in a large measure. The air also is able to enter the soil very easily and nitrification takes place readily. With sufficient moisture and with plenty of plant food the trees will make vigorous growth and good crops of fruit will be borne.

Fruit growers who have followed the custom of keeping their orchards in sod, and who decide to cultivate them in future, should be careful not to break up the sod in the autumn, especially in those parts of the country where the winters are severe. The roots which have not been disturbed, it may be for years, will be near the surface and are likely to be injured, and are perhaps destroyed altogether by hard frost. It is better to plough in the spring. The first ploughing, to break up the sod, should be shallow, as it is not wise to destroy too many roots at one time. Sometimes, if the sod is not too thick, a spade or disc harrow can be used successfully instead of the plough.

If a clover crop has been left over the winter, it may be allowed to grow in the spring until there is a good crop to plough under, but in districts where droughts occur the land should be ploughed as soon as it is dry enough to work, not waiting for the clover to grow up ; thus much moisture which would otherwise be transpired by the leaves of the clover would be saved, and the chances of suffering from drought lessened, by beginning cultivation earlier than it is generally begun in some places. Ploughing should be done in alternate years towards and from the trees, so as to keep the soil level. The following extract from Bulletin No. 164 of the Michigan Experiment Station, giving the results of an experiment to test the amount of moisture in the soil, shows what may be saved by early cultivation :—

'Two tests were made of this question in Field No. 6. The plowing was done May 2. Samples were taken for determination of moisture on May 10 and 17, with the following results :—

| May 10. | 1st Foot. | 2nd Foot. | 3rd Foot. | Average 3 feet. |
|---|---|---|---|---|
| | Per cent. | Per cent. | Per cent. | Per cent. |
| Spring plowed | 10·50 | 10·07 | 8·04 | 9·54 |
| Not plowed | 10·10 | 8·12 | 7·26 | 8·49 |
| | ·40 | 1·95 | ·78 | 1·05 |
| May 17. | | | | |
| Spring plowed | 9·33 | 6·75 | 6·97 | 7·68 |
| Not plowed | 8·78 | 5·92 | 6·82 | 7·17 |
| | ·55 | ·83 | ·15 | ·51 |

'This gives a difference in the first instance of 2·8 pounds per square foot to a depth of three feet and 1·4 pounds in the second instance, in favour of the land ploughed early in the spring.

'Experiments tried by Professor King and reported in the Wisconsin Report for 1881, p. 101 and 102, show larger differences. The plowing was done April 29 and samples taken May 6, showing a difference for the upper three feet of 7·02 pounds of water per square foot. On another plot the observed difference of the samples taken May 14 to the same depth was 4·65 pounds.'

These determinations all show that to have as large a supply of moisture as possible for the crop it is necessary to plow or work the soil in some way to form a mulch to prevent evaporation as early in the spring as the condition of the land will allow.

After the land has been ploughed it should be harrowed or cultivated at intervals until about the middle of July. There is no fixed rule as to the number of times that harrowing should be done, as much will depend on the character of the season. The object, however, should be to keep the surface soil loose from spring till July. The soil should be cultivated after every shower of any consequence, and even if no rain falls it should be stirred at least once a week. Cultivation should cease in July, in order that late growth will not be encouraged, and that the wood may get thoroughly ripened. If cover crops are grown they will need the intervening time before winter to make the growth necessary to form a good protection for the roots of the trees.

Constant cultivation year after year has the effect of reducing the humus in the soil, and the system just recommended should not be followed too rigidly. Circumstances should guide the fruit grower as to the best methods he should adopt to maintain sufficient humus in the soil. At the Central Experimental Farm there is naturally very little humus in the soil, as most of the orchard land is a light, sandy loam. There is, however, sufficient moisture, and drought is not feared. The methods adopted here are, consequently, somewhat different from those recommended in most cases. The following extract from the Annual Report of the Horticulturist for 1898 will give the reasons for the course we have adopted.

COVER CROPS.

'The clover sown for cover crops on 1st August, 1897, in the orchards, mention of which is made in the report of the Horticulturist for that year, came through the winter in splendid condition. Nowhere was there any winter-killing and when growth began it was a fine sight to behold. On the 13th June clover in the crab apple, pear, and plum orchard was turned under. Part of this land was re-seeded on the 14th July, with Mammoth Red clover, at the rate of 12 pounds per acre, and part with about equal parts of Mammoth Red clover and Lucerne mixed. This formed a good covering by autumn. In a part of the apple orchard where the soil is very poor, the clover was ploughed under on the 26th May. The land was harrowed and pease were sown at the rate of 2½ bushels to the acre on 1st of June. On the 22nd July, when the pease were beginning to bloom, and about 2 feet 6 in. high, they were turned under, and, after harrowing, equal parts of Mammoth Red and Lucerne clovers were sown at the rate of 12 pounds to the acre. Owing to the very dry autumn, the Mammoth Red clover did not make as vigorous a growth as could be desired, but the Lucerne was 11 inches in height when frozen. These two crops of leguminous plants ploughed under this season will improve the texture of the soil and enrich it considerably. The clover in the greater part of the apple orchards was not ploughed under this year. This is contrary to what is usually recommended, but it was left for several reasons. In the first place, the soil in the orchard is a sandy loam which is easily moved by the wind. During the years in which the orchards have been under cultivation, the soil has blown away so much from a number of the trees that the roots are more or less exposed. A second reason why it was left, was to determine whether the trees would seem to suffer in time of drought. Notwithstanding the exceptionally dry summer which we had, neither the clover nor the trees seemed affected by the drought, except in a small portion of the Russian orchard. This would seem to indicate that the soil in the orchards does not lack moisture. Taking all things into consideration, namely, the texture of the soil, its capacity for holding moisture, the exposure of the orchard, the destruction of purslane, which it seems impossible otherwise to kill, even with thorough cultivation, and the belief that it is better not to encourage too vigorous growth when so near the limit of the successful growing of large fruits, it was thought better not to cultivate this year."

The objects of growing cover crops and the experience gained in growing them at the Central Experimental Farm were set forth in the annual report of the Horticulturist for 1899, as follows:—

'Since 1895, orchard cover crops have received much attention at the Central Experimental Farm, and in the reports of the Horticulturist for 1896,

1897 and 1898, considerable space has been devoted to this subject; but the importance of cover crops in the orchard cannot be too often nor too strongly impressed upon the fruit growers of Canada. After the disastrous effects of last winter on fruit trees in some parts of Ontario, the fruit growers living in those districts must realize more than ever before, perhaps, how necessary it is to have some protection for the roots of their trees.

It is now quite generally conceded that cultivation should cease in orchards in Eastern Canada about the middle of July. At this time the season's growth is well advanced and the ripening of the wood soon begins. The seed which is to produce the future cover crop should now be sown. In Eastern Ontario, the Common Red or Mammoth Red clover, sown broadcast at the rate of 12 pounds to the acre, will probably make the most satisfactory cover crop. It will reach a height of from 10 to 12 inches by winter, and will form a dense mat of foliage which will make a thick mulch, thus preventing the alternate freezing and thawing of the ground which occurs in late winter or early spring, and which often proves so disastrous to trees. After the seed is sown, the soil should be rolled with a heavy land roller, which will cause the moisture to rise to the surface of the soil and assist the germination of the seed. This rolling is very important, as, should the seed lie in the ground for any length of time without germinating, there will not be time for a good cover crop to be formed before winter. No nurse crop is, as a rule, necessary. In places where the soil is very dry, Lucerne or alfalfa might be sown with advantage, as the seed of this clover appears to germinate more readily than that of the Common Red clover. Cow peas and Crimson clover may be used in the warmer parts of the country.

Another advantage of clover growing in an orchard in autumn, is that much of the plant food in the soil which has been liberated and made more easily available by the constant cultivation during the early part of the summer, is prevented from leaching by being used by the growing plants, the clover thus becoming a 'catch crop,' as well as a cover crop.

Where soils suffer from lack of moisture in a dry time, the clover should be ploughed under as early in the spring as the land can be worked, and cultivation begun at once. This will conserve much of the moisture which would otherwise be transpired through the leaves of the growing plants until they were ploughed under towards the end of May, which is the usual time. If the soil, however, always contains plenty of moisture, it would be better to let the clover grow until about the third week of May, as there would be additional humus and nitrogen obtained by this method.

The great improvement made in the soil by the annual ploughing under of clover crops is shown by figures given by Mr. G. T. Powell, Ghent, N.Y., U.S., at the annual meeting of the Ontario Fruit Growers' Association, in 1899. After Crimson clover, which had been used as a cover crop, had been ploughed under in an orchard for three years, the soil was analyzed and the following differences were found between that where the clover had and had not been ploughed in:—

| | Clover ploughed under for three years. Per cent. | No clover ploughed for three years. Per cent. |
|---|---|---|
| Water.................. | 15·00 | 8·75 |
| Nitrogen ................ | ·21 | ·12 |
| Humus................. | 2·94 | 1·91 |
| Phosphoric acid available | ·015 | ·008 |

Although such good results would probably not be secured by the use of red clover, still the improvement in the land by such treatment would be very great.

For the reasons mentioned in my report for 1898, the methods which are recommended above have not been adopted at the Central Experimental Farm since the spring of that year. Clover is used for a cover crop, but it is only ploughed under every two years. As the soil here is light and lacking in humus, but apparently contains plenty of moisture, a system of cutting the clover with a field mower and leaving it to rot in the orchard, has been followed. In 1898 five cuttings were obtained, the clover being from 18 to 20 inches high at each cutting and just coming into bloom. It was estimated that from the first four cuttings 25 tons per acre of green crop were left lying on the field. Clover sown in 1898 was cut four times in 1899, and the crop from each cutting appeared fully as good as that of 1898. It can easily be imagined that this is improving the soil rapidly.

Common Red clover was sown in the orchards in 1899 on May 10, 17, 25 and 31; July 4, 11, 18 and 25. There was a good cover crop obtained from all of these sowings, with the exception of that on May 31, which did not germinate well, and from those of August 2, 9 and 16, at which time the weather was very dry and the seed did not germinate until September, and then but thinly. Clover sown on May 17 and 25 was nearly smothered by purslane, but eventually overtopped it and came on well and formed a good cover crop by autumn.

In a part of the apple orchard where the soil is very poor, two green crops were ploughed under in 1899. On June 10, clover which had formed a cover crop the previous winter was ploughed under and the land was then re-sown with buckwheat, soja beans, English horse beans and field pease, with the following results:—

*Buckwheat.*—Sown broadcast on June 17, at the rate of 2 bushels per acre; came up June 23. Ploughed under on July 25. Average height 27 inches. Estimated yield per acre of green crop: 8 tons 335 pounds.

*Soja Beans.*—Sown in drills 6 inches apart on June 17, at the rate of 3 bushels per acre; came up on June 24. Ploughed under on August 7. Average height 14 inches. Estimated yield per acre of green crop: 3 tons 466 pounds.

*English Horse Beans.*—Sown in drills 6 inches apart on June 17, at the rate of 4 bushels per acre; came up on June 27. Ploughed under on August 7. Average height 18 inches. Estimated yield per acre of green crop: 6 tons 592 pounds.

*Field Pease.*—Sown in drills 6 inches apart on June 17, at the rate of 3 bushels per acre; came up on June 24. Ploughed under on July 29. Average height 26 inches. Estimated yield per acre of green crop: 5 tons 1,191 pounds.

After these crops were ploughed under the land was re-seeded with clover on August 2, 9 and 16, in the hope of getting a cover crop by winter, but owing to nearly six weeks of very dry weather about that time the seed did not germinate until September and a cover crop was not formed. The trees in this part of the orchard were mulched with manure.

On July 6, English horse beans were sown in a part of the orchard where the soil was light and where the snow does not lie well in winter. On July 16, after the beans were up, Common Red clover was sown among them at the

rate of 12 pounds per acre. The beans reached a height of 18 inches by autumn and helped very much to hold the snow while they must have gathered much nitrogen during the growing season. There was also a good stand of Common Red clover.

On July 25, Lucerne clover was sown in a part of the orchard where the soil was very light. It reached a height of from 7 to 12 inches by autumn, and although there was a large number of plants destroyed by a storm carrying away the surface soil, there was a fairly good cover crop."

The advantage of using leguminous plants, such as those referred to, for cover crops is that by means of the nodules, or tubercles on their roots they are able to assimilate free nitrogen from the air, and thus add much of this expensive plant food to the soil without cost to the grower. The Hairy Vetch (*Vicia villosa*), another leguminous plant, has given great satisfaction where it has been used. It is a rapid grower and is not injured by light frosts.

In addition to the leguminous plants mentioned above, rye and buckwheat make good cover crops and are often used by fruit growers for this purpose. They have, however, the disadvantage of not adding any more plant food to the soil than they take out of it during their growth.

## RENOVATING ORCHARDS.

Many orchards have been neglected so long and have reached such an age that it will not be profitable to attempt to renovate them, and the best plan would be, in such cases, to plant young trees. On the other hand there are many orchards where the trees, if cared for, would be in the prime of life, and neglect is the only cause which prevents profitable crops from being grown. It is of orchards such as these that a few suggestions are offered as to how to bring them back into good condition. The results desired cannot be accomplished in one year.

To begin with, the trees should be pruned, not too heavily at first, but enough limbs should be taken out to open up the top and permit a free circulation of air and the admission of sunlight to it. The trees will probably be much moss grown, and both they, and the fruit, affected with various diseases, and injurious insects are almost certain to abound. Spraying should be begun early in the season, as recommended in the spraying instructions in this bulletin, and the trees should be kept covered from top to bottom with Bordeax mixture and Paris green until the fruit is almost fully grown. Scraping the trunks and large branches of the trees may be done if there is much moss, but as soon as the tree becomes more vigorous, and air and sunlight are admitted, much of the moss will disappear. If the oyster-shell bark-louse or other scale insects infest the trees, they should be sprayed with the lime mixture, or other materials mentioned in the spraying calendar. As the orchard, if neglected, is almost certain to be in sod, the soil should be ploughed shallow in the spring, turning under a good dressing of manure if it can be procured. If the sod is not too thick it might be worked up with the disc or spade harrow. The ground should then be kept thoroughly harrowed until July, working in other fertilizers if the land is poor and manure is not to be had, and then red clover seed sown at the rate of twelve pounds per acre and the

ground rolled. A good cover crop should be formed by autumn. This would conclude the first season's work. The results would probably be a greatly increased vigour in the trees, and the fruit, though perhaps not plentiful, would be cleaner. The second season, additional, but less, pruning should be done, the trees kept thoroughly sprayed as before, the clover ploughed under in the spring, and the land kept harrowed or cultivated till July, and then seeded down to clover. The fruit should be better than the year before, but not until the third year should the trees be expected to bear heavily and the orchard be in good condition.

PICKING AND PACKING.

It is difficult to give exact information as to the best time to pick apples. Each fruit grower must learn this from personal experience. Some varieties require to be picked at one stage of maturity, and some at another. There are, however, several general directions which may be given. Early apples

Picking apples in Niagara District, Ontario.

which are intended for near markets should be picked when almost mellow, and disposed of as soon as possible, as their season is short. The best way of putting up early apples is in 10 to 20 lb. baskets with leno covers For export purposes they should be picked when well coloured but still firm. Experience will soon teach the best time to pick for this purpose. Winter

apples may be left on the trees until there is danger of injurious frost. In large orchards it is necessary to begin picking in good season, and the different varieties will have to be taken in succession, beginning with the early winter sorts and those varieties which drop easily. An apple before being picked should have its seeds almost mature, and have taken on most of its colour. As seasons vary considerably, judgment has to be shown as to the best time to gather the fruit. It often happens that a good crop of apples of the best quality is ruined by improper picking or gathering. Winter varieties appear so hard when they are picked that one might be led to think a little careless handling would have no injurious effects upon them, but this is not the case. Apples are easily bruised, and some varieties much more easily than others. When an apple is bruised, its appearance is often spoiled for the home market and its shipping qualities very much lessened for the export trade. The bruises of some varieties, while disfiguring the fruit, do not cause the apple to rot rapidly ; on the other hand, there are many varieties which will rot rapidly when once bruised. Bruises may be avoided by careful handling and nothing should induce the practice adopted by some people of shaking the apples from the trees.

There are many kinds of receptacles for picking apples in, but half bushel baskets are about as convenient and satisfactory as any. They should be lined with some soft material to prevent bruising, as too much caution cannot be taken in this regard. A hook may be fastened on the handle so that the basket may be suspended while the picker is at work. The easiest way to remove the apples from the branch will soon be learned. The stem should remain on the apple, as if broken off decay is more likely to set in. The fruit may be either sorted immediately or taken to a store house and done at some future time. Many of the best growers sort and pack in the orchard, and certainly the fruit has much less danger of being bruised if treated in this way. A sorting board covered with some soft material is arranged at a convenient distance from the ground on which the apples are emptied from the baskets. They are then usually sorted into three grades, namely, firsts, seconds and culls. The firsts and seconds are put in baskets as selected and the culls thrown to one side. These baskets should be small enough to go into a barrel, should the latter be used. Machines for grading and sizing fruit have been used for this work in recent years, but, unless the fruit is free from scab or codling moth, the hand will have to be used also. The usual practice is to face the end of the barrel with two layers of apples placed neatly and tightly in it with the hand. These should be a fair sample of the kind of apples which are in the middle of the barrel. The other apples are now gently emptied out of the baskets into the barrel and the fruit is made to settle down by rocking the barrel from time to time. This is a very important factor in successful packing. The last row of apples should come slightly above the heading groove. The apples are pressed into place by means of a lever, and a circular band lined with felt just fitting the barrel, until the top boards can be fitted in. If the apples have been well shaken when being put into the barrel very little pressing is necessary. As all the pressing that is required is to keep the apples from moving, the more pressure that is put on, the greater quantity of bruised apples there will be. Some yielding material, such as excelsior or felt, placed in each end of the barel would lessen the amount of bruised fruit very much.

The choicest fruit packed in bushel boxes brings high prices in England. When packed in this way every specimen should be uniform and perfect.

During the past few years dishonest packing seems to have been growing in Canada, the result being that the reputation of Canadians and Canadian fruit has suffered very much and it will require some years before confidence will again be restored. Apples have been packed in such a manner that the fruit at either end of the barrel gives a very false impression of that in the middle. An Act has recently been passed which will prevent such fraud.

For the information of fruit growers in grading their fruit when packing, the following quotations are made from the Act:

'Every person who, by himself or through the agency of another person, packs fruit in a closed package, intended for sale, shall cause the package to be marked in a plain and indelible manner, before it is taken from the premises where it is packed,—

(*a*) with the initials of the Christian names, and the full surname and address of the packer;

(*b*) with the name of the variety or varieties; and

(*c*) with a designation of the grade of the fruit.

'No person shall sell, or offer, expose or have in his possession for sale any fruit packed in a closed package, upon which package is marked any designation which represents such fruit as of finest, best or extra good quality, unless such fruit consist of well-grown specimens of one variety, sound, of nearly uniform size, of good colour for the variety, of normal shape and not less than ninety per cent free from scab, worm holes, bruises and other defects, and properly packed.

'No person shall sell, or offer, expose or have in his possession for sale, any fruit packed in any package in which the faced or shown surface gives a false representation of the contents of such package; and it shall be considered a false representation when more than fifteen per cent of such fruit is substantially smaller in size than, or inferior in grade to, or different in variety from, the faced or shown surface of such package.'

Some of the best packers pick the fruit, pack it, and close the barrels or cases all in the same day; others pick and pack it the same day, but take it to a store room to cool off over night and then close the barrels or cases the next day. Others, again, do not close them until ready for shipment, and still others do not pack their fruit until they desire to ship it, but merely keep it in boxes or bins. All these systems have their advocates. The best method is probably the second, namely, to pick and pack the fruit the same day, but allow it to cool down before closing the barrels or cases. If the weather is cool they may be closed when packed.

## STORING.

If the fruit is not disposed of at once it should, as soon as it is picked or packed, be put somewhere where the temperature may be controlled and the fruit kept cool. Every fruit grower who has a large orchard should have a proper place for storing his fruit. It often happens that at the time of picking,

the prices for apples are very low. If a grower has not a proper place to store them he is obliged to sell, while if he were able to hold them for a time, better prices would be obtained. This was strikingly the case in 1900.

A cellar often answers the purpose of a storeroom, but it takes a large cellar to store fruit from a large orchard. For most varieties of apples a well ventilated room above ground with comparatively dry air, the temperature of which may be kept low, is the best. Apples such as Russets which shrivel easily keep better in a moist atmosphere. A fruit building may be erected without a great expenditure of money. It should be built in such a manner that the warm air may be kept out and the cooler air kept in, or vice versa. The temperature should be kept as cool as possible in the autumn, and in the winter it should be maintained at from 32°F. to 35°F. The cooler apples are kept without freezing, the better.

Apples may be kept in such a building until they are required for shipment. If they are kept late into the winter they should be repacked before shipping, to avoid sending away anything that will be a discredit to the grower and a loss to the consumer.

In houses in cities it is often difficult to get a place where the temperature may be regulated, as it is usually either too warm or too cold. However, the coolest place should be chosen where there is no danger of frost. If there is a choice of two rooms that with the moister atmosphere would be the better, for, as a rule, the air is too dry for keeping apples properly in a city house. If the apples are in good condition and none of the specimens show signs of rotting they may be left in the barrel or box. If, however, they show signs of rotting they should be sorted and the perfect specimens wrapped in paper. If the room is very dry it will be better to put them back in the barrel, after wrapping, as they will shrivel less when kept in a mass where the air will not get at them so readily.

As the export of the early and tenderer fruits to Great Britain increases, the need of cold storage buildings will be felt and more of them will be erected. The temperature in such buildings will have to be kept down by means of ice or by some other artificial method, as the ordinary storeroom could not be kept cool enough in the heat of summer. To ship early apples to Great Britain successfully it is necessary to pick them before they are fully mature, and keep them constantly cool in the cold storage house, refrigerator car and steamer until they are landed in Great Britain. If they are subjected to a warm temperature between the time they are picked and when they reach the other side of the Atlantic they will be likely to prove a failure.

## MARKETS.

The demand for Canadian apples of good quality and in good condition is an ever increasing one. In Great Britain the market appears to be unlimited and the prospects for opening an extensive trade with other European countries, also, are very bright. The Canadian fruit growers, packers and shippers should see to it that the fruit which is exported is well and honestly packed and that it is of such quality as will increase the demand for it even more than in the past.

At home, also, the consumption of apples is increasing, and when better rates are given by the railways so that the apples may be shipped at less cost

than at present there will be a great demand for this fruit by those who live in those parts of Canada where apples cannot be grown successfully.

### SPRAYING.

Although plants have been treated to prevent and exterminate fungous diseases and insect pests for many years it was not until poisons dissolved and mixed with liquids began to be used extensively for field work that spraying became an important part of successful fruit culture.

When the value of sulphate of copper as a preventive of the fungous diseases of fruits had been discovered, the value of spraying began to be impressed very strongly upon fruit growers. This discovery was made at Bordeaux, France, in 1882, but it was not until 1885 that the first formula was published. The mixture of sulphate of copper, lime and water, then recommended was a very thick and strong one and was applied by means of small brooms. The Bordeaux mixture, as it has been called, was soon tried in America. Experiments were made, and it was not long before it was found that a much thinner and weaker mixture could be used and by 1892 the same formula, practically, as is now recommended, was adopted.

Paris green, one of the most important insecticides, was first used for the destruction of biting insects injurious to fruits about 1872 or 1873, but was not used extensively for this purpose until four or five years afterwards. Its effectiveness is so apparent and it is so easily recognized by its bright green colour that it has become very popular. It is now usually applied with Bordeaux mixture on apple trees by which it looses none of its value.

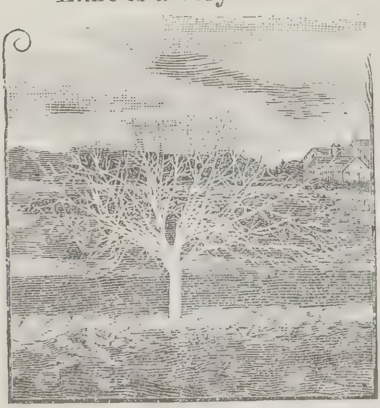
Whale oil soap which is one of the best insecticides for sucking insects was recommended before the Massachusett's Horticultural society in 1842 as a remedy for thrips, red spider and other insects; but it is now used largely for destroying scale insects and aphides. Some of the whale oil soaps in commerce are made from soda, but in order to be effective when used as insecticides they should be made from potash and not from soda

*Kerosene Oil.*—The first published record of the use of this insecticide was in the Gardener's Monthly, December, 1865, when it was recommended for destroying scales on orange and other trees. Cook, of the Michigan Agricultural Experiment Station, appears to have been the first experimenter to recommend the kerosene emulsion, which he did in 1878. Kerosene and water are now used for destroying sucking insects, but the oil often injures the trees and great care has to be taken with it. Kerosene emulsion is a good remedy for sucking insects, but is not as readily made as some others, and on this account has not been as popular as it otherwise would have been.

Crude petroleum has for the past two years been recommended as a remedy for the San José Scale, Dr. J. B. Smith, New Brunswick, N.J., having done most to bring it into prominence through his experiments. It has been very effective in some instances and in others it has not, while sometimes it has proven injurious to the trees. Crude petroleum is not uniform in composition and hence has to be used with caution.

Tobacco has been used for a long time as a remedy for sucking insects and is one of the best in use at the present time. There is little danger of injuring trees with it, yet it is very effective in killing soft bodied insects such as aphides. Tobacco water is easily made and applied.

Lime is a very useful substance in spraying. It has made both sulphate of copper and Paris green quite safe to use in proportions which would otherwise be injurious to foliage. It was recommended as long ago as 1850 as a remedy for plum curculio and it has proven very effective in destroying the pear-tree pyslla. The whitewashing of the trunks of trees is an old custom, and while it was not always known why the lime was applied, the results must have been good or the custom would not be such an old one. In 1899 it was discovered by the Horticulturist at the Central Experimental Farm that lime was very effective in ridding trees of the oyster-shell bark-louse, and this new use of lime should prove of much value to fruit growers where this insect is prevalent.



Apple tree sprayed with lime wash to destroy oyster-shell bark louse.

With the development of spraying came the development of spray pumps and nozzles, as, up to the time of the advent of Paris green and Bordeaux mixture, the pumps and nozzles used were not very suitable for the purpose, but these have been so perfected during the past few years that it is now difficult to find where an improvement can be made. Many intermediate pumps may be had between the small hand syringe and the powerful pump fitted to a forty gallon barrel, by means of which the tops of the highest apple trees may be reached with the spray. For orchard work it is most economical to get one of the best and most powerful pumps made. These can be obtained for from $18 to $24. Smaller pumps may be bought, but they are not suitable for orchard work. If, however, an extension rod is obtained, cheaper pumps may be used in gardens where there are but few trees and where most of the spraying is done on small fruits and vegetables. Such pumps may be obtained for from $5 upwards.

At the Central Experimental Farm much attention has been given to spraying. In the first annual report, being that for the year 1887, the Entomologist published formulæ to be used, and in every report since has insisted on the necessity of spraying. Before the experimental farms were established he had, in his report to the Minister of Agriculture for 1885, published formulæ from his own experiments. Since 1890 many experiments have been conducted by the Horticulturist and Entomologist to determine the best formulæ to adopt, and if possible to discover some new remedies. In addition to the information given in the annual reports the following publications have been issued on spraying, 'Treatment of Apple Scab, Grape and Gooseberry Mildew' (Bulletin 10, 1891) by J. Craig. 'Recommendations for the Prevention of Damage by Some Common Insects of the Farm, Orchard and Garden' (Bulletin 11, 1891) by J. Fletcher. 'Spraying for the Prevention of Fungous Diseases and Injurious Insects' (Bulletin 23, 1895) by Fletcher and Craig. Spraying calendars by Fletcher and Craig in 1895 and 1897, and by Fletcher and Macoun in 1899 and 1901.

As the advantages of spraying have been thoroughly proven and demonstrated by men who have been employed by the Government to do this work, and as the matter has been written about time and again in reports, bulletins, periodicals, newspapers and spraying calendars, one might be led to think

that all farmers and fruit growers would now spray their trees as a matter of course, just as they plough their fields; but this, unfortunately, is not the case, and there is still a large proportion of men engaged in fruit growing who do not spray. There is also another class of men who, knowing that spraying with Bordeaux mixture and Paris green will materially lessen the amount of scab and codling moth, do spray their trees, but are not satisfied with the results; the reason of the poor success being, either that the mixture is not properly made, the trees are not sprayed thoroughly, or the spraying is not done at the proper time. Spraying is an expensive operation, and it is surprising that so many continue to waste hard-earned money by not doing the work properly. The early sprayings are the important ones, and these are too often neglected on account of press of other work, and when spraying is begun it is often too late to be of much service. A certain number of sprayings are suggested in the spraying calendars, and the times when they should be made. It should, however, be impressed on those who spray, that if heavy rain occurs before the mixture has dried on the trees, it will be washed off and the work must be done over again. The neglect of this is probably one of the chief causes of poor success in sprayiug. Spraying should be done thoroughly, and the underside of the leaves should receive as much of the spray as the upper sides. Every leaf or fruit missed means a foothold for disease or insect pests. In preparing the mixtures and solutions, the formulæ given on the spraying calendars prepared by the Central Experimental Farm and similar institutions, should be followed as closely as possible. If a man knows the chemical composition of the materials he uses, and has made a study of spraying, he may alter them slightly to meet certain circumstances, but if his knowledge of the materials used goes no further than the name, he should follow the instructions closely. He should also do his spraying at the seasons suggested. A delay of a few days may mean the loss of practically all the mixture or solution used without getting anything in return.

Spraying calendars are published, from time to time at the Central Experimental Farm, conjointly by the Entomologist and Horticulturist in which are given full instructions for the preparation of the various formulae recommended and the time at which each spraying should be made.

### DISEASES AND OTHER INJURIES TO APPLES AND APPLE TREES.

*Apple Blight or Fire Blight* (*Bacillus amylovorus*). This disease often does much injury to apple trees. It is usually first indicated by the sudden drying up of the young twigs and spurs. Often whole branches will be affected and sometimes the trunk itself, causing the tree to die or become practically useless. The bacteria which cause the disease enter through the blossoms and bark of the tree. The Russian varieties of apples appear more subject to it than others. There is no known preventive or good remedy. Affected twigs and branches should be cut off about a foot below the affected part and burned to prevent the further spread and dissemination of the disease.

*Black Spot Fungus or Scab* (*Fusicladium dendriticum*). During recent years the apple scab fungus has been very troublesome, often injuring the fruit so badly that it is quite unsaleable. The disease attacks the tree in early spring and is first noticeable as light green patches on the young leaves. The fruit may be affected as soon as formed and if badly diseased will drop off. As the fruit increases in size the diseased patches enlarge and nearly all the surface

is often covered with the black spots before the fruit is picked. In addition to the disfigured appearance of the fruit, caused by this disease, the apples do not reach their full size. The apple scab develops most rapidly in moist weather. This disease may be almost entirely prevented by the proper use of Bordeaux mixture, the remedy recommended at the end of this paragraph. While a certain number of applications are recommended, more wil have to be given if the season is wet. The object should be to keep the trees covered with the mixture from the first until the last spraying. If the mixture is washed off the tree the disease will have an opportunity of developing and it is difficult to check it, if it begins to spread.

REMEDY.—Spray with copper sulphate solution (1 lb. copper sulphate to 25 gallons water) before buds start; and with Bordeaux mixture, just before blossoms open; soon after blossoms fall and two or three times after at intervals of from 10 to 15 days. The first three sprayings are the most important.

*Crown Gall* (*Root Gall*). Indicated by hard, gall-like masses on the crown and sometimes on the roots of apple trees, particularly on young trees. These galls often interfere very much with the circulation of sap in the trees, causing them to become sickly, and frequently resulting in their death. The roots of most of the large fruits are affected, and in the United States the losses from this disease have been very great. Until recently, it was not known what caused this injury. It was thought by some that the galls were simply malformations caused by the injury to the tree or were produced by unsuitable soil, by others, that they were produced by a parasitic fungus, and again, that they were caused by insects. This disease has been given much study recently by J. W. Toumey, of the Arizona Agricultural Experiment Station (see Bulletin 33). His conclusions are that it is caused by a parasitic slime-mould, the spores of which may be readily disseminated by the wind or by other means. No remedy has yet been found, and trees affected with it should be destroyed and burned to prevent its spreading. If the galls are removed, only, they will grow again. No trees should be planted which have had these galls upon them.

*Dry Rot.*—This is a disease which affects the fruit and is indicated on the exterior of the apple by small circular depressions. When the skin is removed, dryish, brown tissue is found at the diseased spots, and when the fruit is badly affected this brown and pithy condition may be seen extending through much of the fruit. The diseased flesh is not bitter but is dry, tough and without flavour. When the apple is badly affected its commercial value is almost destroyed. Various causes have been assigned to this disease, namely, want of vigour of tree, lack of moisture in the soil, want of potash and lime in the soil. By those who have given most study to the rot it is ascribed to the concentration of sap caused by the transpiration of moisture, which causes the death of the cells. There is not yet any known remedy for this disease, but it will probably not be as troublesome if there is plenty of moisture in the soil, and if the trees are encouraged to make good, healthy growth.

*Sunscald.*—The injury to apple trees known as sunscald is one of the most serious hindrances to successful apple culture, particularly in the northern and eastern parts of Ontario and in the province of Quebec. Newly planted trees are, as a rule, more seriously affected by it than older ones, but both often suffer badly. The unhealthy appearance of the bark and wood on the south and south-west sides of the trunk of the tree and on the larger branches is the first indication of this injury. Afterwards the bark and wood dry up and fall away. Trees are often so badly affected that they die. This injury occurs

during the latter part of winter or very early in spring when there are warm days and cold nights. This injury may be prevented to a large extent by only planting trees which are headed low, thus exposing but a short trunk to the rays of the sun; also by inclining the young trees somewhat to the south when planting, thus preventing the sun's rays striking the trunk except for a short time. Where trees have been planted and are liable to become sunscalded, the trunks may be protected by using a veneer of wood which encircles the trees, thus preventing the rays of the sun from striking the trunk. It should be loose so that there will be an air space between it and the tree. The ends of it can be fastened together by means of wire. Another protector is made of finely meshed galvanized iron netting which is more permanent than the wooden protector. In outlying districts where these protectors cannot be purchased, a good substitute may be made out of birch bark. Building paper tied around the tree is also useful. All of these protectors are effective in preventing the ravages of mice. Cornstalks, boards, and many other things may be used to protect the tree from sunscald. Nothing, however, that will be likely to harbour mice should be used. When a tree has been injured by sunscald the injured parts should be carefully cleaned away and the wound covered with grafting wax or paint. If the tree is young and likely to suffer, it should be protected in the manner described above.

*Mice.*—Mice often girdle the trees in the orchard in winter, especially when it is in sod or when there is rubbish lying about in which they like to harbour. Everything in the way of rubbish should, however, be removed before winter. Their depredations may be prevented either by wrapping the trunks with building paper in autumn and banking up the earth about the base to the height of about a foot; by encircling the trunk with fine galvanized iron netting; or by using the veneer protectors used to prevent scalding. Where the latter are used the earth should be banked up a little at the base to prevent the mice from going underneath.

If a tree is girdled by mice it usually dies. If, however, as soon as the injury is noticed, the wound is cleaned and covered with grafting wax and wrapped with cloth so that the air is excluded and the wood prevented from drying out, the sap which rises through the soft wood will continue to do so and returning through the inner bark, growth will be made all around the upper part of the wound, and if the latter be not too large there is a chance of its healing over. If, however, the wood becomes dry before the bandage is put on it will almost certainly die. When the wax and bandage are applied the tree should be headed back considerably to lessen the amount of transpiration of moisture, as there will not be as much sap rise as if the tree were uninjured. Girdled trees are sometimes saved by connecting the upper and lower edges of the girdle with scions, which are inserted all around the trunk. Mice may be destroyed in the orchard by using a mixture of one part by weight of arsenic with three parts of corn meal. To use this safely nail two pieces of board each six feet long and six inches wide together so as to make a trough. Invert this near the trees to be protected and place about a tablespoonful of the poison on a shingle and put it near the middle of the run, renewing the poison as often as is necessary.

# APPLE INSECTS.

By James Fletcher, Entomologist and Botanist.

In a condensed consideration of the most important insect enemies of the apple grower, it may be pointed out that these may be divided under the following headings:—

Those which devour the foliage;
Those which bore in the wood;
Those which occur on the bark; and
Those which attack the fruit.

All insects fall within two classes which can be separated by the nature of their mouth parts. A consideration of this point is of the utmost importance in the intelligent use of remedies. In the first class, Biting Insects, which have jaws with which they consume the substance of their food, as caterpillars, all that is necessary is to place on the food plant some poisonous material which will be eaten with the food. In the second class, Sucking Insects, which instead of jaws have a beak or hollow tube with which they suck up their food in a liquid form, as the plant-lice, something must be used which will kill by mere contact with their bodies.

For some insects such as borers in the wood, which cannot be reached by the above remedies, preventive measures may be taken by which the plants are rendered distasteful to the mature insects when seeking a suitable place to lay their eggs. For this purpose, various alkaline or strong-smelling deterrent washes are used.

The following are the formulæ of standard remedies which are recommended by the Entomologist and Botanist:—

## INSECTICIDES AND FUNGICIDES.

### I. Kerosene Emulsion.

(*Riley-Hubbard formula.*)

Kerosene (coal oil)....................................2 gallons.
Rain water..............................................1 gallon.
Soap.........................................................½ lb.

Dissolve soap in water by boiling; take from fire, and, while hot, turn in kerosene and churn briskly for 5 minutes. To be diluted before use with 9 parts of water.

### II. Paris Green.

Paris green .............................................. 1 lb.
Lime (fresh)............................................. 1 lb.
Water ....................................................200 gallons.

*For dry application.* 1 lb. Paris green with 50 lbs. flour, land plaster, slaked lime or any other perfectly dry powder.

### III. Whale-oil Soap.

For scale-insects (young).............1 lb. in 5 gallons water.
For aphis.......................................1 lb. in 8 gallons "
For San José scale (in winter)......2 lbs. in 1 gallon "

### IV. Tobacco and Soap Wash.

*For Plant-lice or Aphis.*

Soak in hot water for a few hours 10 lbs. of tobacco leaves (home grown will do); strain off and add 2 lbs of Whale-oil soap. Stir until all is dissolved, and dilute to 40 gals. Apply early and two or three times at short intervals.

### V. Alkaline Wash.

*For Borers.*

Soft soap reduced to the consistency of thick paint by the addition of a strong solution of washing soda in water. If applied with a brush during the morning of a warm day, this will dry in a few hours and form a tenacious coating not easily dissolved by rain.

### VI. Poisoned Bordeaux Mixture.

*For Fungi and Insects on Fruit-trees.*

| | |
|---|---|
| Copper sulphate (blue-stone) | 4 lbs |
| Lime (fresh) | 4 lbs. |
| Paris green | 4 oz. |
| Water (1 barrel). | 40 gallons. |

Dissolve the copper sulphate (by suspending it inside a wooden or earthen vessel containing 4 or 5 or more gallons of water.) Slake the lime in another vessel. If the lime, when slaked, is lumpy or granular, it should be strained through coarse sacking or a fine sieve. Pour the copper sulphate solution into a barrel, or it may be dissolved in this in the first place; half fill the barrel with water, add the slaked lime, fill the barrel with water and stir thoroughly. It is then ready for use.

Stock solutions of dissolved copper sulphate and of lime may be prepared and kept in separate covered barrels throughout the spraying season. The quantities of bluestone, lime and water should be carefully noted.

### VII. Copper Sulphate Solution.

| | |
|---|---|
| Copper sulphate (blue-stone) | 1 lb. |
| Water | 25 gallons. |

As soon as dissolved it is ready for use. *For use only before the buds open.*

### Caution.

For the purposes of this note the operating of "Spraying" consists of applying liquids by means of a force pump and spraying nozzle with such force as to break up the liquid so thoroughly that it falls upon the plants treated as an actual mist or spray. Such terms as *sprinkling* and *showering* are inaccurate for the operation here intended. Unfortunately much of the so-called spraying as usually carried out could more accurately be designated by these terms, which describe a much less careful and less even distribution of liquids.

## THE WORST ENEMIES OF THE APPLE TREE.

### *ATTACKING THE FOLIAGE.*

1. The Eye-spotted Bud-moth (*Tmetocera ocellana*).—Small, dark brown caterpillars, $\frac{1}{4}$ of an inch in length, with black heads and collars, destroying the buds when just unfolding, and sometimes boring down the centre of the twig. *Remedy:* Spray early with a strong Paris green wash (Paris green 1 pound, fresh lime 1 pound, water 100 gallons).

2. The Cigar Case-bearer (*Coleophora fletcherella*) and
3. The Pistol Case-bearer (*Coleophora malivorella*).—Small yellow caterpillars in curved cases, which pass the winter on the twigs of apples and cluster around the opening buds, injuring the foliage and flowers. *Remedy:* Spray early with the wash mentioned under No. 1 above, or with kerosene emulsion (Formula I).

4. Leaf-rollers.—The caterpillars of several small Tineid moths, when full-grown from $\frac{1}{4}$ to $\frac{1}{2}$ inch in length, which bind together the young leaves and flower buds, forming a tent inside which they feed. *Remedy:* The same as for No. 1.

5. Tent Caterpillars (*Clisiocampa*).—Two kinds attack the foliage of the apple as well as of many other trees. The Apple-tree Tent Caterpillar forms a tent in the fork of two twigs; the Forest Tent Caterpillar does not make a conspicuous tent, but spins a flat mat of silk on the side of a branch or on the trunk; to these resting places the young caterpillars resort when not feeding. The mature insects are thick-bodied, reddish brown moths expanding about $1\frac{1}{2}$ inches across the wings, which are crossed obliquely by two bands. These bands are pale in the first-named, but dark in the moth of the Forest Tent Caterpillar. During July the females lay rings of about 200 eggs on the twigs of trees, in which state the insect passes the winter. *Remedies:* Collect and destroy the egg clusters during the winter. Spray the trees with poison (Formula II or VI) directly the young caterpillars are noticed. All tents should also be cut off and destroyed early, before the leaves hide them.

6. Green Fruit Worms (*Xylina*).—Green caterpillars dotted and lined with yellowish white, $1\frac{1}{2}$ inches long, occasionally attacking the foliage and the forming fruit. *Remedy:* Spraying regularly with Formula VI will prevent injury from these insects.

7. Cankerworm (*Anisopteryx pometaria*).—Silver brown caterpillars about an inch in length, with only six pairs of legs, occurring sometimes in large numbers, attacking the leaves so severely as to give the trees the appearance of having been scorched with fire. The wingless female moths appear only in autumn and climb up trees to lay their eggs in flat patches on the bark. From these the young caterpillars hatch in spring. *Remedies*: Spray as soon as caterpillars appear with Formula II or VI. In autumn, place mechanical contrivances or bands of thick paper painted with a mixture of castor oil 2 pounds, rosin 3 pounds; or with printer's ink, or some other viscid substance to catch the females when ascending the trees to lay eggs.

8. The Apple Aphis (*Aphis mali*).—During winter small shining black eggs may be found on the twigs. From these, early in spring, green plant-lice hatch and cluster on and in between the young leaves of the opening buds. They also occur in large numbers beneath the leaves in autumn. *Remedies*: Tobacco and soap wash (Formula IV.), whale-oil soap (1 lb. in 8 gallons of water, Formula III).

## *ATTACKING THE WOOD.*

9. Borers: Flat-headed Borer (*Chrysobothris femorata*), Round-headed Borer (*Saperda candida*).—The above named are the two commonest kinds of borers which attack the apple. They vary somewhat in their habits, but the best remedy for both is undoubtedly a regular treatment every June just before the time the eggs are usually laid, with deterrent washes, such as Formula V or the same with crude carbolic acid added in the proportion of 1 pint to 4 gallons of the wash, to be applied with a large brush to the bark of the trunks and larger limbs. When a tree is infested, the presence of the grub may be detected by the borings which it pushes out of its burrows and by the sunken discoloured appearance of the bark. By cutting through the bark the grub can be destroyed. If it has penetrated into the wood, it can be killed with a piece of stout pliable wire.

## *OCCURRING ON THE BARK.*

10. The San José Scale (*Aspidiotus perniciosus*).—Minute almost circular scale-insects, one thirtieth of an inch wide, shaped like an inverted saucer with a depressed ring around a central point. Inside this ring, black or dark-coloured This very inconspicuous insect, when in small numbers, is easily overlooked, but when abundant gives to the bark a dirty, scurfy and grayish colour as though dusted with ashes. *Remedy:* This is by far the most difficult insect to eradicate which the fruit growers have ever had to deal with. In cases of bad infestation the destruction of infested trees with fire will be found the most economic course. The two treatments which have given the best results, are the spraying of trees in winter or before the buds burst with whale-oil soap solution (2 lbs. in 1 gallon of water) or with a 25 to 30 per cent application of crude petroleum and water. Experiments are now being carried on to discover a more effective safe remedy for this insect.

11. The Oyster-shell Bark-louse (*Mytilaspis pomorum*).—Small scale-insects furnished with a beak and protected by a waxy scale one-tenth of an inch in length shaped somewhat like an elongated oyster shell. The young lice hatch in spring about 1st of June, when they possess legs and are active for a few days only; at this time they are soft and unprotected. There is only one brood in the year. *Remedy:* Spray the trees during winter with lime wash (1 or 2 lbs. of fresh lime to a gallon of water), or, when the young scale-insects hatch, spray with kerosene emulsion (Formula I) or whale-oil soap (Formula III).

There are several other kinds of scale-insects which occur upon the apple, which may be treated in the same way as the Oyster-shell Bark-louse.

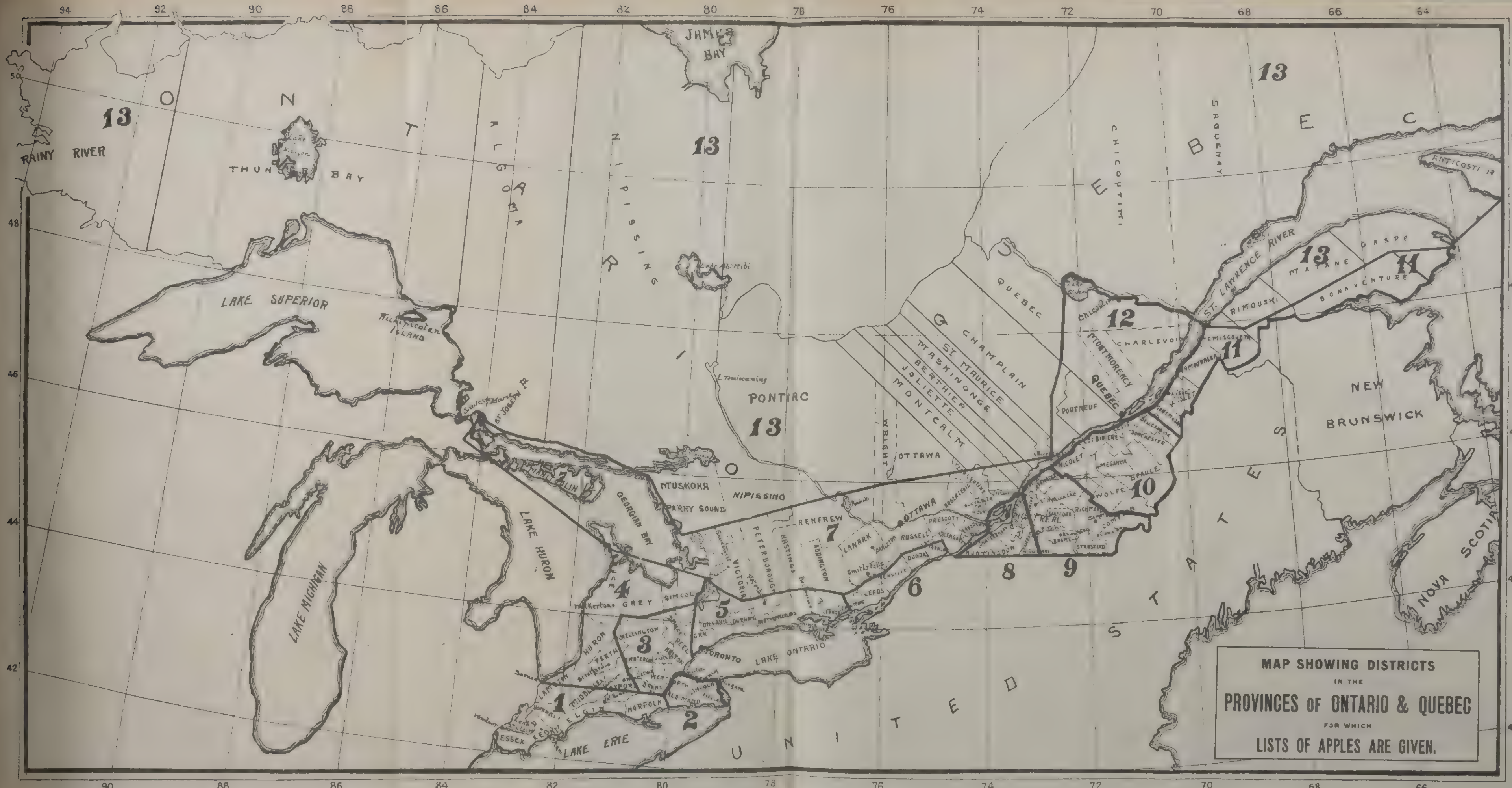
12. The Woolly Aphis (*Schizoneura lanigera*).—Clusters of white downy plant-lice, causing wart-like excrescences on the roots and stems or around wounds where a branch has been cut off. This insect is seldom a serious pest in the East, but is very troublesome in British Columbia. *Remedies*: Spray the colonies on the branches and trunks with kerosene emulsion or a wash made with 1 pound of concentrated lye and 1 pound of whale-oil soap in 5 gallons of water. For the root colonies, remove the surface soil to a depth of 6 inches, for a foot or two around the trunk and dig in tobacco dust or refuse from a tobacco factory.

## *ATTACKING THE FRUIT.*

13. The Codling Moth (*Carpocapsa pomonella*).—This is the parent of the destructive Apple Worm so well known to all growers and consumers of apples all over the world. In Eastern Canada there is only one regular brood of the insect; west of Toronto there are two broods, the latter of which is by far the more destructive. Where there is only one brood, spraying with Paris green (Formula II or VI) three or four times in the spring, beginning immediately after the flowers have fallen, at intervals of ten days, is all that is required; where there are two broods, banding the trees in autumn with strips of burlap, whisps of hay, or one of the many contrivances known as "tree protectors," will be found necessary. The caterpillars resort to these shelters when ready to spin their cocoons and can be easily destroyed at any time before the following spring, when the moths would emerge.

Besides protecting apple trees from the attacks of the Codling Moth, spraying with the poisoned Bordeaux mixture (Formula VI), as advised above, will destroy many other enemies which feed on the foliage, such as Cankerworms, Tent Caterpillars, Leaf-rollers, &c.

The Apple Maggot (*Trypeta pomonella*).—Slender white footless maggots, $\frac{1}{4}$ of an inch in length, tapering gradually to the head and cut off abruptly behind, burrowing in all directions through the flesh of apples, feeding on the pulp and leaving brown channels. There are sometimes as many as a dozen maggots in a single apple. Infested fruit ripens prematurely and falls, when the maggots leave and, entering the soil a short distance, form puparia inside which they remain unchanged until the following spring. *Remedy*: Spraying is useless against this insect. The remedy most to be relied on is the prompt destruction of windfalls so as to prevent the maggots going into the ground. This can best be done by keeping a sufficient number of pigs, sheep or other stock in the orchard. The penning up of poultry beneath infested trees has been found a most useful practice.




**MAP SHOWING DISTRICTS IN THE PROVINCES OF ONTARIO & QUEBEC FOR WHICH LISTS OF APPLES ARE GIVEN.**

DEPARTMENT OF AGRICULTURE

CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

# SOFT PORK

AN

## INVESTIGATION INTO ITS CHARACTER AND CAUSES

BY

FRANK T. SHUTT, M.A.

*Chemist, Dominion Experimental Farms*

BULLETIN No. 38

OCTOBER, 1901

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE.

# CONTENTS

To the Honourable
The Minister of Agriculture.

SIR,—I herewith submit for your approval Bulletin No. 38, of the Experimental Farm series, which has been prepared under my direction by Mr. F. T. Shutt, chemist of the Dominion Experimental Farms, in which is given the results of a series of investigations into the character and causes of soft pork.

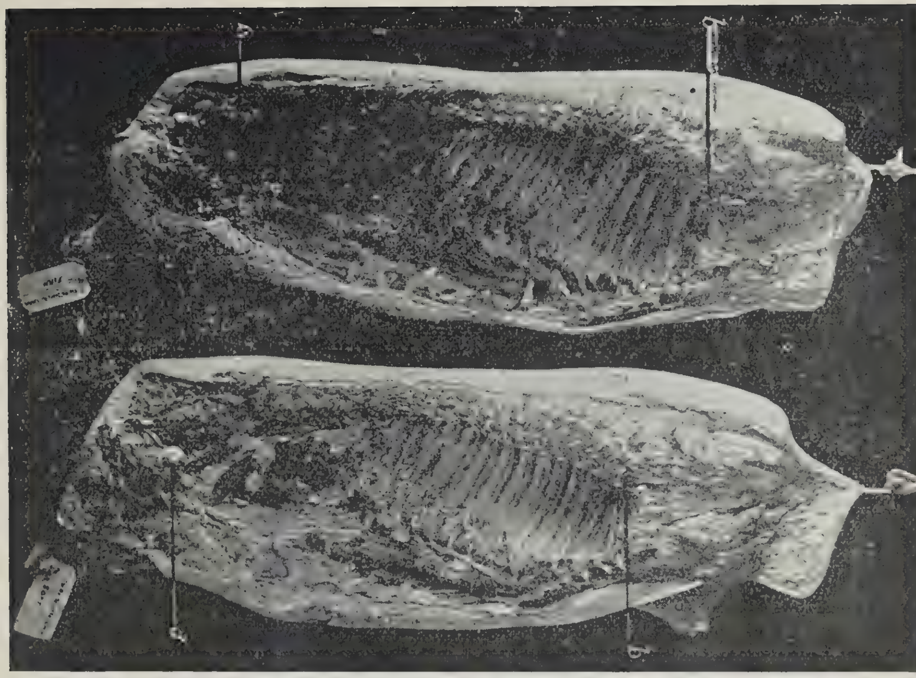
This subject is a most important one, bearing as it does on a profitable and rapidly growing branch of farm industry, one which can be carried on with advantage in nearly all the settled parts of the Dominion. From the results presented in this bulletin, it will be seen that much light has been thrown on this difficult subject, and that by persistent chemical research, based on the results obtained from the feeding of a variety of rations, the causes and conditions by which softness in the fat of pork is brought about are satisfactorily shown.

It is hoped that the information contained in this bulletin will be of much practical value to all who are engaged in the pork industry and that it will lead to greater uniformity of character and an average higher quality in Canadian bacon and stimulate further progress in this division of farm work.

I have the honour to be,
Your obedient servant,

WM. SAUNDERS,
*Director Experimental Farms.*

OTTAWA, October 15, 1901.



Firm and soft sides of Pork.

A B

Group of Pigs fed on (A) Corn Meal and Skim-milk; and (B) Corn Meal only.

# SOFT PORK.

## AN INVESTIGATION INTO ITS CHARACTER AND CAUSES *

BY

FRANK T. SHUTT, M.A., F.C.S.,

*Chemist, Dominion Experimental Farms.*

### INTRODUCTION.

That the export bacon trade is one of great importance to Canada is obvious from the fact that last year we received from England more than $12,000,000 for this commodity alone. Moreover, the limit has not yet been reached ; those engaged in the packing business assure us that the demand for first-class Canadian bacon will continue to increase for some years to come. It is, therefore, advisable that our farmers and dairymen should well understand the requirements of this large and remunerative market as regards size, shape, fatness and, above all, the character or quality of the bacon. These are matters which closely concern the raiser of pigs, for they are not under the control of the packer. Further, it is well to remember that the highest price will only be paid in England for that article which conforms with the demands of the consuming public, and that it is only first-class bacon that can be exported with profit.

Among the qualities necessary for first-class bacon in England, none is of greater importance than firmness. A tendency to softness or tenderness is quite sufficient to rate the bacon at second-class prices, and, if this softness is at all pronounced, to make it altogether unsaleable at a profit.

Since it was reported by our packers that a large, though varying, proportion of the pigs offered them produced soft bacon, and that this detrimental character specially characterized the produce of pigs from certain districts, it was held that an investigation to learn the nature and the cause or causes of 'soft' pork would, in all probability, furnish information of a most useful and valuable character.

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*The feeding trials which this investigation necessitated were planned and conducted by Mr. J. H. Grisdale, Agriculturist, Central Experimental Farm. In addition to this most important part of the work, Mr. Grisdale, by his advice and assistance in the factory inspection and rating of the animals, has rendered most valuable aid, and I am much indebted to him for his hearty co-operation in bringing this research to a successful issue.

## THE NATURE OF 'SOFTNESS.'

Naturally, the first step in undertaking the solution of this difficult problem was to ascertain the difference in composition of 'firm' and 'soft' pork, so that chemical analysis might be employed as an accurate discriminating agent in the examination of pork produced under varying conditions of food, exercise, &c., and that we might obtain standards that could serve as a basis for future work and comparison. Accordingly, we procured (February 1, 1899) from The Wm. Davies Co., Limited, Toronto, two (salted) Wiltshire sides, the one marked 'firm' and reported as of excellent quality; the other marked 'soft,' and stated as of very inferior quality. The former weighed 46 pounds; the latter, 44 pounds.

Both were frozen when received, but, nevertheless, there was a marked difference in the relative hardness of the two sides. As the sides thawed (at the temperature of the laboratory, about 70°F.) this difference—which was ascertained or measured by the resistance of the fatty portions to pressure by the finger—became still more pronounced. This was further evinced (February 2) in raising the ham by lifting as the sides lay on the table; the 'firm' remained fairly straight, whereas, the 'soft' doubled over. The relative softness is also shown in the accompanying photograph, the sides having been suspended the night previous. It illustrates the amount of 'drag' caused by the weight of the sides, similarly suspended by hooks. The extent of the 'drag' in the 'soft' side is much the greater.

The samples of the fat for examination were obtained by first cutting the sides (*a*) immediately in front of the thigh joint (socket of the femur in the pelvic arch), and (*b*) immediately in front of the first rib, and then taking the fatty tissue at each of these sections. Those taken at (*a*) are designated in the following tables as 'Loin'; those at (*b*) as 'Shoulder' (see photo). The precaution of confining the place or area from which the fat was taken was considered advisable from the fact that it has been stated that the fat varies considerably in composition, according to its position in the animal. Care was exercised in the preparation of the sample for analysis, to dissect out and reject all muscular tissue, blood vessels, &c.

The principal data obtained in this examination are presented in the following tables. Table I contains the percentages of the various constituents determined, in the fatty tissue of the two bacons :—

TABLE I.—Composition of Fatty Tissue in 'Firm' and 'Soft' Bacon.

| — | Firm. | | Soft. | |
|---|---|---|---|---|
| | Loin. | Shoulder. | Loin. | Shoulder. |
| | p. c. | p. c. | p. c. | p. c. |
| Water | 15·56 | 6·53 | 12·50 | 2·67 |
| Salt | 2·73 | 1·12 | 1·84 | ·48 |
| Nitrogen | ·504 | ·285 | ·243 | ·142 |
| Fibre (nitrogenous tissue) | 3·15 | 1·78 | 1·52 | ·89 |
| Fat | 78·56 | 90·57 | 84·27 | 95·96 |
| Olein in bacon | 50·05 | 58·33 | 66·37 | 76·94 |
| Palmitin and stearin in bacon | 28·51 | 52·24 | 17·90 | 19·02 |

The fat proper consists essentially of olein, fluid at ordinary temperatures, and palmitin and stearin, solid at ordinary temperatures. It was hence conjectured that the percentage of olein would be found to be greater in the fat of the 'soft' than that

of the 'firm' pork.* Accordingly, the olein in the dry, filtered fat was estimated, and it is from the figures so obtained that the percentages of olein and palmitin and stearin in the bacon, given above, were calculated. The detailed analyses of the pure fats and the ratio of the olein to palmitin and stearin contained therein are given in table II.

TABLE II.—Composition of Fat from 'Firm' and 'Soft' Bacon.

| — | Firm. | | Soft. | |
|---|---|---|---|---|
| | Loin. | Shoulder. | Loin. | Shoulder. |
| | p. c. | p. c. | p. c. | p. c. |
| Olein (calculated) | 63·71 | 64·40 | 79·95 | 80·18 |
| Palmitin and stearin | 36·29 | 35·60 | 20 05 | 19·82 |
| Ratio of palmitin and stearin to olein | 1 : 1·76 | 1 : 1·80 | 1 : 3·99 | 1 : 4·02 |

These figures show very clearly that the fat of the 'soft' bacon contains a much larger proportion of olein than that of the 'firm' bacon, accompanied necessarily by a correspondingly decreased proportion of the solid fats, palmitin and stearin. We have in this fact—the large percentage of olein—the explanation of the peculiar and characteristic flabbiness of 'soft' pork. We also have afforded us in this discovery, through the estimation of olein, a ready means of tracing the effect of any particular food or condition on the pork produced.

Table III sets forth certain determinations made on the pure, filtered fat. Though of a strictly scientific character, they are of considerable importance, since they allow us to make deductions easily understood and of a practical character regarding the nature of the fats.

TABLE III.—Physical and Chemical Constants of Fat from 'Firm' and 'Soft' Bacon.

| — | Firm. | | Soft. | |
|---|---|---|---|---|
| | Loin. | Shoulder. | Loin. | Shoulder. |
| | p. c. | p. c. | p. c. | p. c. |
| Melting point | 37·6° C. | 37·75° C. | 27·4° C. | 28·2° C. |
| Specific gravity at 96° C | ·8668 | ·8859 | ·8678 | ·8740 |
| " " 100° F. | ·9009 | ·8980 | ·8970 | ·8988 |
| Sapon. equivalent | 285·3 | 282·3 | 287·3 | 286·0 |
| Reichert number | ·408 | ·714 | ·408 | ·663 |
| Iodine absorbed | 55·3 | 55·9 | 69·4 | 69·6 |

*In addition to olein, no doubt a certain proportion of linolein—also a fluid fat—occurs in the fat of soft pork, and especially in that produced from corn. It will be seen from the present investigation that not only is there a close relationship between the consistency of a fat and its composition, but also that the food has a marked effect upon that composition, and hence upon its consistency or relative firmness. The oil of corn possesses more or less of this fluid fat linolein, which finds its way in part through the animal economy into the body fat. In the method of analysis employed, advantage was taken of the fact that these fluid fats are unsaturated and combine with iodine, and in this respect differ from plamitin and stearin, the solid fats. From the amount of iodine so absorbed, the fluid fat present was calculated, which, for the sake of simplicity, has been recorded in this bulletin as olein. Wherever the term olein is used, it is intended to include all fluid fats present.

No purpose will be served by discussing in detail the above data in this bulletin ; but the fact may be emphasized that they indicate the olein content and melting point, and especially the former, as data of great diagnostic value in this research. Indeed, to such a degree has subsequent work shown this to be the case that, although many other determinations, *e.g.*, nitrogen, non-fatty tissue, &c., were made on the larger number of pigs, we shall only present the figures for the olein and melting point estimations. We feel convinced that these data are reliable and in themselves sufficient to be used exclusively in pronouncing a judgment upon the relative firmness of the pork under investigation.

## IMMATURE OR 'UNRIPE' PORK.

After the completion of the foregoing work and at the outset of the investigation about to be described, four very young pigs were examined in order to learn the nature of the fat of immature animals. Of these, two were from Western Ontario and two from Eastern Ontario. These pigs were slaughtered at the Geo. Matthews Co. Packing House, Hull, Que., June 27, and examined June 28, 1899. We adjudged Nos. 57 and 58 as decidedly soft, and Nos. 59 and 60 as only moderately firm.

An independent examination was made by Mr. W. E. Matthews, some two days later. His report is as follows :—'We have looked the little pigs over and think they are almost too small to secure anything definite from, but we find that Nos. 59 and 60 are by far the firmer pigs, No. 57 being a little soft, and No. 58 the softest of the lot. Not knowing where the pigs came from, we express the opinion that they are from what we would call a 'corn section,' as the fat on all shows signs of oil.'

It is to be noticed that this expert adjudged all the pigs soft (though varying in degree of softness), but considered them too small to draw definite conclusions from. It will now be shown that the laboratory data bear out in a marked manner Mr. Matthews's judgment. As already stated, only the data respecting the olein and melting point will be considered here, the other results being of minor importance for the purposes of this investigation.

TABLE IV.—Immature Pork ; Composition and Melting point.

| No. of Pig. | Locality. | Dressed Weight. | Olein. | | Ratio of Palmitin and Stearin to Olein. | | Melting Point. | |
|---|---|---|---|---|---|---|---|---|
| | | | Shoulder. | Loin. | Shoulder. | Loin. | Shoulder. | Loin. |
| | | Lbs. | p. c. | p. c. | p. c. | p. c. | | |
| 57 | West............. | 27 | 90·6 | 88·2 | 1 : 9·6 | 1 : 7·5 | 25·2° C. | 24·4° C. |
| 58 | " ............ | 23 | 86·9 | 85·9 | 1 : 6·5 | 1 : 6·1 | 24·5° C. | 25·7° C. |
| 59 | East............ | 42 | 83·3 | 82·2 | 1 : 4·9 | 1 : 4·6 | 27·6° C. | 28·5° C. |
| 60 | " ............ | 30 | 73·3 | 72·9 | 1 : 2·7 | 1 : 2·7 | 29·8° C. | 32·0° C. |

These pigs when killed had been recently weaned, hence the results furnish us with no information regarding the effect of feed ; it is significant, however, that the two softest were obtained from a so-called 'corn section' in Western Ontario.

If the above data are compared with those of table II. it will be observed that in all the fats the percentage of olein is considerably greater than that in the fat obtained from the 'firm' supplied by The Davies Co. Exceedingly instructive also is a comparison of the ratio of palmitin and stearin to olein. Thus, in the fat of the 'firm' pork of The Davies Co. we obtained 1 : 1·76 ; the ratio for the fat of the same part of the pig No. 60 (the firmest of the four) was 1 : 2·69.

It seems probable that the fat of all young pigs contains a large amount of olein, and is consequently more or less soft. From this and subsequent work we are inclined to think that age and maturity or ripeness are factors of importance towards a 'firm' fat. In discussing the various rations used in this investigation, we shall place in each table the results obtained from certain immature or 'unripe' pigs (killed at about 100 lbs. live weight) taken from each pen, and it will be seen that the fat of these aniamls invariably possesses a larger percentage of olein than that of the remainder of the pigs on the same ration, which were not slaughtered until they had reached a live weight of 180 to 200 lbs.

## STANDARDS OF FIRMNESS.

We are not as yet, perhaps, in a position to establish standards of firmness, that is, to say exactly what percentage of olein is to be considered as the limit for pork technically known as 'firm'; but for the purpose of comparing the various results here presented we shall be obliged to adopt provisional limits. These have been decided upon since the completion of the investigation, which has been in progress for the past two and a half years, from the chemical results and the ratings made at the packing house. In connection with the latter data, it should be stated that each dressed pig, after being thoroughly chilled, was critically examined at the packing house. In this investigation we adopted a scale of firmness ranging from 100 downwards. The cut surface of the fat along the back was felt and rubbed with the fingers, and that which was hardest and most resistant to pressure, rated at 100. The softest examined was placed at 20. Oiliness was also specially noted, and it is of interest to know there were but few cases in which the softness (slight resistance to pressure) was not accompanied by this quality. Thickness of fat, shape of carcase, &c., were also remarked.

It is to be pointed out as the result of our experience, that such an inspection, even when made by an expert, cannot furnish figures that will so closely differentiate as to relative softness as do the percentages of olein. In fact, in order to obtain comparative ratings, even of a fairly accurate character, it is essential that the carcases should remain at least forty-eight hours after slaughtering in a refrigerating room of uniform temperature before inspection.

During several months of the winter, artificial refrigeration to chill the carcases in the packing house is unnecessary at Ottawa, and it was noted not unfrequently that the temperatures to which the carcases were exposed during these periods fell to many degrees below zero. As a natural result many of our ratings for individual pigs in the winter are too high. On the other hand, we have found that if owing to any cause the temperature of the refrigerating room in summer is allowed to rise, the ratings are too low.

For these and other obvious reasons, we believe that the olein content furnishes by far the more reliable indication of relative firmness; we are of the opinion that unless the very greatest care and judgment be exercised, the rating from inspection at the packing house is in a matter of close discrimination of little save corroborative value. It is for this reason that in the presentation of the subject we have arranged the ratings in the charts or tables according to percentages of olein rather than by the factory values. Further, to avoid as far as possible the introduction of error arising from such differences of temperature as we have alluded to, we have adopted certain terms and affixed values thereto, as indicated on the following page :—

## FACTORY OR INSPECTION RATINGS.*

| | | | | |
|---|---|---|---|---|
| Very firm | from 85 | to | 100 | points. |
| Firm | " 75 | " | 85 | " |
| Moderately firm | " 70 | " | 75 | " |
| Soft | " 50 | " | 70 | " |
| Very soft | Less than | | 50 | " |

The percentages of olein corresponding to the above classification we find to be approximately as follows :—

| | Percentage of Olein. |
|---|---|
| Very firm | 68 and less. |
| Firm | between 68 and 71 |
| Moderately firm | " 71 " 73 |
| Soft | " 73 " 75 |
| Very soft | " 75 " above. |

## THEORIES REGARDING THE CAUSE OF 'SOFTNESS.'

Many theories have been advanced to account for softness in pork. Some have ascribed it to the character of the food, others to undue forcing of the pig in the earlier stages of growth, to killing the pig while in 'heat' or slaughtering while still immature or unripe, to the breed of the pig, to the locality or district in which the pig is grown, and even the phase of the moon when the pig is slaughtered has been assigned as a cause.

## SCHEME AND OBJECTS OF THE INVESTIGATION.

On the completion of the preparatory work already recorded, the first series of feeding trials was instituted upon the Central Experimental Farm, Ottawa, followed by a laboratory examination of the pork produced. There were in all about one hundred and eighty pigs, and the experiment was commenced in the month of May, 1899, when the majority of them were between one and two months old.

They were either Tamworths or Tamworth grades.

The scheme of the trial was such that information would be gained as to the effect upon the quality of the pork of the following possible factors :—

1. Character of food (*a*) fed throughout life, and (*b*) fed during the initial and finishing periods, respectively.
2. Limited and unlimited supply of food.
3. Soaked or cooked grain as against dry or uncooked grain.
4. Age of animal when slaughtered.
5. Exercise and lack of exercise.
6. Locality or district where raised.

Details of the above may be briefly ascribed as follows :—

1. The character of the various foods used, together with particulars regarding its supply and treatment (*vide* 1, 2, and 3 above) are shown in the following scheme :—

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*The pigs of both 1st and 2nd series were slaughtered and dressed at the packing house of The Geo. Matthews Co., Ltd., Hull, Que., where the inspection ratings were made. We are indebted to the Messrs. Matthews for much valuable advice and assistance in the grading of the carcases.

## RATIONS: FIRST SERIES OF FEEDING TRIALS, 1899.

| | | |
|---|---|---|
| A | ½ oats, pease and barley (in equal parts) | Boiled. |
| B | ½ oats, pease and barley (in equal parts) | Boiled. |
| | Limited and unlimited. | |
| B | ½ oats, pease and barley (in equal parts)<br>½ corn meal | Dry. |
| | Limited and unlimited. | |
| C | Corn meal exclusively | Dry. |
| | Unlimited. | |
| D | Oats, pease and barley (in equal parts) | Dry. |
| | Unlimited. | |
| E | Corn meal exclusively | Soaked. |
| | Unlimited. | |
| F | Oats, pease and barley (in equal parts) | Soaked. |
| | Unlimited. | |
| G | Beans, 1 part<br>Shorts, ¾ part | Boiled. |
| H | FIRST PERIOD—½ corn meal<br>½ oats, pease and barley (in equal parts) | Boiled. |
| | SECOND PERIOD—Corn meal | Boiled. |
| I | FIRST PERIOD—½ corn meal.<br>½ oats, pease and barley (in equal parts) | Dry. |
| | SECOND PERIOD—Corn meal | Dry. |
| J | FIRST PERIOD—Corn meal | Dry. |
| | SECOND PERIOD—Oats, pease and barley (in equal parts) | Dry. |
| K | FIRST PERIOD—Oats, pease and barley (in equal parts) | Dry. |
| | SECOND PERIOD—Corn meal | Dry. |
| L | FIRST PERIOD—Corn meal | Soaked. |
| | SECOND PERIOD—Oats, pease and barley (in equal parts) | Soaked. |
| M | FIRST PERIOD—Oats, pease and barley (in equal parts) | Soaked. |
| | SECOND PERIOD—Corn meal | Soaked. |
| N | ½ corn meal.<br>½ oats, pease and barley (in equal parts). | |
| O | ½ corn meal.<br>½ oats, pease and barley (in equal parts).<br>Mangels. | |
| P | ½ corn meal.<br>½ oats, pease and barley (in equal parts).<br>Pastured on clover. | |

In pens H, I, J, K, L, M, it will be noticed that two rations were used ; the first was fed until the pigs reached a live weight of 100 pounds, the second, from that weight until the pigs were finished. This method allowed us to ascertain the effect on the quality of the pork of the various rations at different periods of growth.

Where not otherwise stated, a sufficiency of green fodder, usually pease and oats, in addition to the grain ration was given to keep the animals in a thrifty condition.

2. As regards the supply of food, the pigs in one pen on each ration were given all they would eat, and this has been termed 'unlimited' ; the pigs in the duplicate pen were fed with that quantity only that was thought necessary for normal growth ; and this has been given in the tables as 'limited.'

It is very doubtful, however, if in experiments conducted with several pigs in a pen this classification is of any value, for we have found that, no matter what the supply may be, the larger animals practically get an unlimited quantity, while the smaller ones are sometimes on an extremely limited ration. We have accordingly grouped together in the tables of data the pigs on the 'limited' and 'unlimited' supplies of the same ration.

3. In two experiments, cooked as against a dry grain mixture was tried ; in four cases, the effect of soaked as against dry grain was ascertained.

4. To ascertain what effect lack of maturity might have, two pigs from each pen were examined when they had reached the live weight of 100 pounds; the remainder were fed until they attained a live weight between 175 and 200 pounds.

5. To ascertain the result of exercise on the production of firm pork, an equal number of animals on each ration was placed (*a*) in small paddocks containing shanties or shelters, and, (*b*) in a pen of the piggery, each pen having a small yard attached. The pigs in the former are assumed to have had unlimited exercise, and are designated in the tables as 'outside' while those in the piggery are considered to have had limited exercise only. These latter are placed under the heading 'inside.'

6. Each pen, as a rule, consisted of sixteen pigs, eight of which had been obtained in Western Ontario (Essex and Kent counties) and eight in Eastern Ontario (Carleton County). This feature was adopted at the request of certain packers, who considered eastern bred pigs of better quality.

To render this account more concise, and consequently easier of comprehension, we purpose placing the detailed data in tabular form together at the end of the bulletin, simply discussing here the averages obtained from each pen. These data, although, as stated, are somewhat in detail, represent only a part of the estimations made. All the determinations which do not apparently throw any light on the object of this investigation have been omitted, for the reason that they might confuse the reader. On the same ground, the pigs on 'limited' and 'unlimited' rations are classed together and the averages of the results of the 'shoulder' and 'loin' fats are also given, the differences being too small to merit in this bulletin detailed discussion.

## GENERAL RESULTS FROM FINISHED PIGS. FIRST SERIES, 1899.

In order to obtain at a glance the relative merits of the various rations in the production of firm pork, a table showing the average percentage of olein and the average melting point of each pen will be first presented. In this table the rations are arranged from above downwards in the order of 'firmness,' as indicated by the olein ; that is, the ration giving least olein is placed at the head, and that producing most olein, at the bottom of the chart. We shall then discuss briefly these results and proceed to analyse more closely each ration separately, giving in chart form the figures for the olein content of the fat of the pigs obtained from the east and west respectively, and of those raised with and without exercise. In the appendix we shall place tables giving further details from each pen of pigs. These should be referred to in order to observe the effect of individuality among the animals similarly fed under the same conditions.

TABLE V.—AVERAGES from determination of 1st Series, 1899.

| Ration. | Composition of Ration. | Olein. | Melting Point. |
|---|---|---|---|
| F | Oats, pease and barley, $\frac{1}{3}$ each, soaked, unlimited | 67·2 | 35·6 |
| D | " " " dry, unlimited | 67·5 | 34·2 |
| B | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, dry, unlimited | 71·1 | 34·4 |
| A | " " " boiled, unlimited | 72·7 | 33·6 |
| B[1] | " " " dry, limited | 73·1 | 33·1 |
| M | 1st Period: Oats, pease and barley, $\frac{1}{3}$ each, soaked. 2nd Period: Corn meal, soaked | 73·4 | 32·5 |
| N | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, dry, limited | 73·7 | 30·5 |
| K | 1st Period: Oats, pease and barley, $\frac{1}{3}$ each, unlimited. 2nd Period: Corn meal, dry, unlimited | 74·3 | 32·4 |
| O | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, mangels | 74·9 | 31·7 |
| I | 1st Period: $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, dry, unlimited. 2nd Period: Corn meal, dry | 75·4 | 32·4 |
| A[1] | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, boiled, limited | 75·9 | 33·6 |
| P | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, steamed clover | 76·1 | 32·1 |
| L | 1st Period: Corn meal, soaked. 2nd Period: Oats, pease and barley, $\frac{1}{3}$ each, soaked | 76·4 | 32·3 |
| I[1] | 1st Period: $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, dry, limited. 2nd Period: Corn meal, dry, limited | 78·1 | 31·8 |
| H | 1st Period: $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, boiled, unlimited. 2nd Period: Corn meal, boiled, unlimited | 77·9 | 33·0 |
| J | 1st Period: Corn meal, dry, unlimited. 2nd Period: Oats, pease and barley, $\frac{1}{3}$ each, dry, unlimited | 78·8 | 31·3 |
| H[1] | 1st Period: $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each, boiled, limited. 2nd Period: Corn meal, boiled, limited | 80·0 | 30·2 |
| G | Beans 1 part, shorts $\frac{3}{4}$ part | 84·7 | 31·0 |
| C | Corn meal, dry, unlimited | 92·0 | 30·9* |
| E | Corn meal, soaked, unlimited | 92·4 | 27·7 |

The more important inferences to be drawn from these data may be briefly stated as follow :—

**1. That of all the grain rations employed, that consisting of equal parts of oats, pease and barley gave the firmest pork. It may further be added that the fat was deposited evenly and not too thickly, and that this ration gave a very thrifty growth.**

**2. That no difference could be observed in the firmness of the pork from the preceding ration whether fed soaked or dry.**

**3. That when half the grain ration (as in A and B) consists of corn meal, the resulting pork shows an increased percentage of olein ; in other words, a tendency to softness.**

* Melting point average on two pigs only, as the fat of the others was so soft that the melting point could not be determined.

4. That in this ration (half corn meal, half oats, pease and barley in equal parts) the feeding of it boiled gave a slightly higher olein content, but this is only apparent when the average from the four pens is taken into consideration.

5. That considering the effect of feeding the ration of oats, pease and barley during the first period (to a live weight of 100 pounds) and corn meal during the finishing period, compared with the reverse of this plan—that is, corn first, followed with oats, pease and barley—we may conclude that the former gives a firmer pork.

6. That in both methods mentioned in the preceding paragraph, no marked difference was to be observed from the ration fed dry or previously soaked, though taking an average of the two groups on each ration the 'dry' feed gave a somewhat higher olein content.

7. That when as in rations I and H, corn meal formed half the first period ration, and the whole of the second period ration, the resulting pork was somewhat softer than from that of any of the rations already discussed. We conclude that the longer the period during which the corn is fed as a large proportion of the ration, the softer will be the pork.

8. That beans produce a soft and inferior pork. The growth of the pigs so fed was poor and miserable and the deposition of the fat meagre. (See illustration.)

9. That corn meal fed exclusively as the grain ration, either dry or previously soaked, results in an extremely soft fat, the percentage of olein being considerably higher than from any other ration tested. The pork was of an inferior quality. Here also we noted the miserable growth of the animals, the ration in no sense being an economical one. *

## GENERAL RESULTS FROM IMMATURE PIGS, 1899.

Similar data for the immature (100 pounds live weight) pigs are presented in Table VI. It will be noticed that save in the case of the oats, pease and barley ration, the percentages of olein are very high, denoting an extremely soft pork.

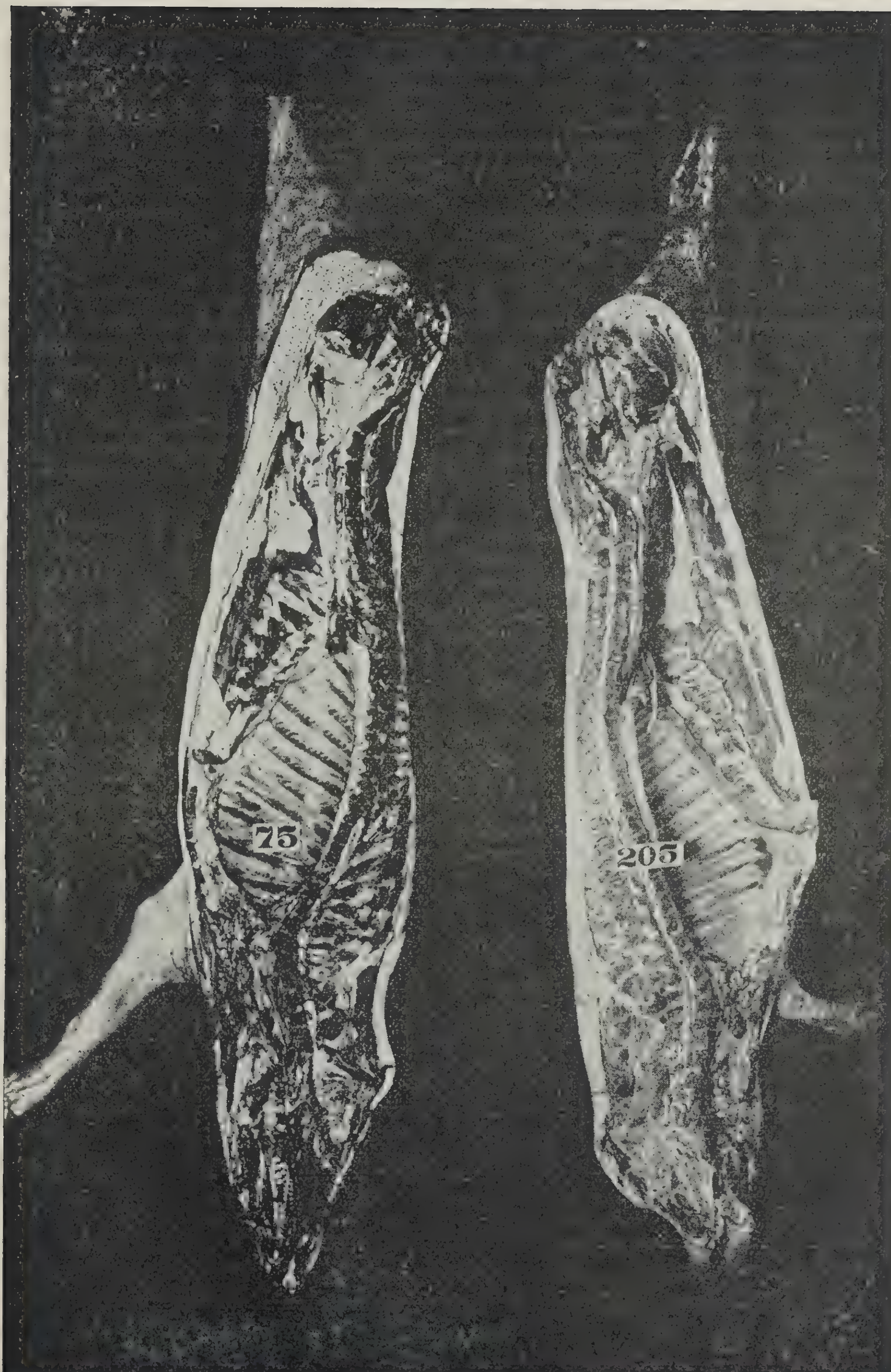
TABLE VI.—AVERAGE PERCENTAGE of Olein in Fat of Immature Pigs.

| Ration. | East. | West. | Mean. |
|---|---|---|---|
| Ration A.—½ corn meal; ½ oats, pease and barley, ⅓ each, boiled, unlimited.... | †77·1 | †91 6 | 84·3 |
| " " " " limited...... | 79·2 | ........ | ........ |
| " B.—½ corn meal; ½ oats, pease and barley, ⅓ each, dry, unlimited...... | 83·0 | *87·1 | 85·0 |
| " " " " limited.......... | 75·0 | 83·5 | 79·3 |
| " C.—Corn meal, dry, unlimited.......... | 87·2 | 85·6 | 86·4 |
| " D.—Oats, pease and barley, ⅓ each, dry, unlimited.......... | 80·9 | 83·6 | 82·1 |
| " E.—Corn meal, soaked, unlimited.......... | 85·7 | 88·4 | 87·0 |
| " F.—Oats, pease and barley, ⅓ each, soaked, unlimited.......... | 71·9 | 77·0 | 74·4 |
| " G.—Beans 1 part, shorts ⅔ part.......... | †83·9 | ........ | ........ |

These results are confirmatory of those already quoted from our experiments made at the outset of the inquiry (see page 10), and furnish, in our opinion, un-

*In any consideration of the foregoing conclusions, it should be borne in mind that they are based upon averages obtained from a large number of determinations, each figure of Table V. being the mean of estimations from twelve to sixteen examinations. As will be seen as we proceed in the inquiry, considerable differences exist between individuals under the same conditions and on the same food, differences that are probably due in part to what we may term lack of thrift, in part to immaturity or unripeness, and in part to causes yet undiscovered. It is advisable for the reader, therefore, to study the tables that follow and the explanatory text that accompanies them. In this way only can a correct impression be gained as to the varying results obtained in this investigation and their practical bearing on pig feeding.

† One pig only.




No. 75.—Indian corn

No. 205.—Beans

doubted proof of the 'soft' character of the fat of young pigs. Though all show a very large percentage of olein, the proportion of this constituent present varies with the character of the ration. The order of softness is practically identical with that found for the mature pigs, though that order has not been adopted in tabulating the results.

## DETAILED DATA FROM THE GROUPS OF FIRST SERIES, 1899.

In the following tables we have given the results of the different rations fed under the varying conditions already enumerated, placing the figures side by side. We have, however, averaged the estimations from pigs under a limited and unlimited food supply, feeling assured that this distinction in pens containing a large number of pigs had little or no value. The data, therefore, set forth are the percentages of olein from the rations fed soaked or boiled and dry to eastern and western pigs, respectively, under conditions of limited and practically unlimited exercise, the latter being denoted in the tables as 'inside' and 'outside' respectively.

When comparing the rating by olein with those from inspection, it should be remembered that the former are averages from two or more animals, that may or may not differ materially, while the latter are from individuals. The ratings, therefore, are not strictly comparable. Further, owing to the fact that it was impossible to inspect and grade all the pigs at the same temperature, the inspection ratings cannot be considered so accurate an indication of relative firmness as the olein content, nor can it be expected, for the same reason, that this factory rating will always agree with the classification from the laboratory data.

## RATION A AND B—ONE-HALF CORN MEAL; ONE-HALF OATS, PEASE AND BARLEY, IN EQUAL PARTS.

Considering first the finished pigs, we may bring together the olein content as follows :—

| | Per cent Olein. |
|---|---|
| Boiled grain | 74·3 |
| Dry grain | 72·1 |
| Eastern pigs | 73·4 |
| Western pigs | 73·0 |
| Inside | 71·9 |
| Outside | 74·5 |
| Average of all | 73·2 |

In connection with these data it will be instructive to note the ratings as to firmness obtained at the packing house :—

| | V.F. | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| Boiled grain | .. | 2 | 2 | 9 | 3 |
| Dry grain | 1 | 1 | 1 | 11 | 2 |
| Eastern pigs | .. | 2 | 2 | 11 | 1 |
| Western pigs | 1 | 1 | 1 | 9 | 4 |

The olein values place the majority of these pigs on the border line between 'moderately firm' and 'soft'; the inspection ratings adjudge twenty of the thirty-two animals as soft. It would seem, therefore, that when corn to the extent of half the ration is continued throughout life, and no corrective, as skim milk, is employed, the tendency will be towards the production of a soft or oily fat. In a number of the pigs the fat along the back was too thick and of uneven deposition.

The immature pigs of A and B (distinguished in the table by a dressed weight of less than 100 pounds) gave the following olein values :—

| | |
|---|---|
| Boiled grain | 82·7 |
| Dry grain | 81·7 |
| Eastern pigs | 78·6 |
| Western pigs | 86·7 |
| Inside | 83·6 |
| Outside | 80·1 |

The inspection ratings are as follow :—

| | S. | V.S. |
|---|---|---|
| Eastern pigs | 3 | 4 |
| Western " | 2 | 2 |

It is seen from these results that although the ration consisted of one-half of corn meal throughout the whole feeding period, the quality of the pork improved as the pigs reached maturity.

## TABLE VII.

Ration A and B.—One-half Corn Meal ; one-half Oats, Pease and Barley.

| No. of Pigs. | Dressed Weight. | Percentage of Olein. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Boiled. | | | | Dry. | | | |
| | | Inside. | | Outside. | | Inside. | | Outside. | |
| | | East. | West. | East. | West. | East. | West. | East. | West. |
| | Lbs. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. |
| 1 | 67 | 77·2 | ... | ... | ... | ... | ... | ... | ... |
| 2 | 64 | ... | ... | 79·2 | ... | ... | ... | ... | ... |
| 1 | 66 | ... | 91·6 | ... | ... | ... | ... | ... | ... |
| 4 | 127 | 73·0 | ... | ... | ... | ... | ... | ... | ... |
| 4 | 136 | ... | ... | 75.6 | ... | ... | ... | ... | ... |
| 4 | 125 | ... | 73·6 | ... | ... | ... | ... | ... | ... |
| 4 | 124 | ... | ... | ... | 75·0 | ... | ... | ... | ... |
| 2 | 76 | ... | ... | ... | ... | 80·3 | ... | ... | ... |
| 2 | 65 | ... | ... | ... | ... | ... | ... | 77.8 | ... |
| 2 | 67 | ... | ... | ... | ... | ... | 85.4 | ... | ... |
| 1 | 69 | ... | ... | ... | ... | ... | ... | ... | 83·2 |
| 4 | 140 | ... | ... | ... | ... | 70·5 | ... | ... | ... |
| 4 | 139 | ... | ... | ... | ... | ... | ... | 74·5 | ... |
| 4 | 133 | ... | ... | ... | ... | ... | 70·6 | ... | ... |
| 4 | 137 | ... | ... | ... | ... | ... | ... | ... | 72·9 |

## RATION C AND E.—CORN MEAL EXCLUSIVELY.

The results from four pens fed upon corn meal only are given in Table VIII. The pigs with corn meal soaked and dry made very poor growth, very few of them reaching 100 pounds live weight before December (seven months) and several scarcely arriving at that weight by the following April, when the pigs would be eleven or twelve months old. Of the twenty-four animals in the two pens only five had exceeded 170 pounds live weight when the experiment was closed, May 28. Undoubtedly this lack of thrift is in a large measure due to the small proportion of nitrogenous or flesh-forming substances present in corn. Bone-forming material (mineral matter) is also deficient in this grain, and this fact no doubt still further accentuates its unsuitability when used alone, for young and growing stock.

As regards olein, the results show that the fat of all the pigs contain a very high percentage ; the so-called finished pigs, in this instance, giving the larger figures. The data of each group are strikingly uniform, as will be noticed from the following tabulation :—

*Finished Pigs.*

| | Per cent of Olein. |
|---|---|
| Soaked grain | 92·5 |
| Dry grain | 92·1 |
| Eastern pigs | 91·2 |
| Western pigs | 93·4 |
| Inside | 92·3 |
| Outside | 92·3 |
| Average of all | 92·3 |

*Immature Pigs.*

| | |
|---|---|
| Soaked grain | 87·1 |
| Dry grain | 86·4 |
| Eastern pigs | 86·5 |
| Western pigs | 87·0 |
| Inside | 87·6 |
| Outside | 85·9 |
| Average of all | 86·8 |

By the olein standard, all fall into the class of 'very soft.' In many instances the melting point could not be taken owing to the fluidity of the fat.

Inspection at the packing house gave the rating of twenty-three very soft and one soft. In a large number of pigs the deposition of the fat was very meagre in amount and exceedingly soft in character, and the carcases showed marked evidences of stunted or retarded growth. In every particular, corn meal as the exclusive grain showed itself unsuitable and unsatisfactory.

# TABLE VIII.

## Ration C and E.—Corn Meal.

| No. of Pigs. | Dressed Weight. | Percentage of Olein. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Soaked. | | | | Dry. | | | |
| | | Inside. | | Outside. | | Inside. | | Outside. | |
| | | East. | West. | East. | West. | East. | West. | East. | West. |
| | Lbs. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. |
| 1 | 78 | 87·1 | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 1 | 83 | ........ | ........ | 84·5 | ........ | ........ | ........ | ........ | ........ |
| 1 | 63 | ........ | 84·2 | ........ | ........ | ........ | ........ | ........ | ........ |
| 1 | 71 | ........ | ........ | ........ | 92·6 | ........ | ........ | ........ | ........ |
| 2 | 93 | 92·1 | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 2 | 93 | ........ | ........ | 92·3 | ........ | ........ | ........ | ........ | ........ |
| 2 | 98 | ........ | 93·6 | ........ | ........ | ........ | ........ | ........ | ........ |
| 2 | 110 | ........ | ........ | ........ | 91·9 | ........ | ........ | ........ | ........ |
| 1 | 65 | ........ | ........ | ........ | ........ | 90.9 | ........ | ........ | ........ |
| 1 | 69 | ........ | ........ | ........ | ........ | ........ | ........ | 83·6 | ........ |
| 1 | 76 | ........ | ........ | ........ | ........ | ........ | 88·3 | ........ | ........ |
| 1 | 72 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 82·9 |
| 2 | 90 | ........ | ........ | ........ | ........ | 87·9 | ........ | ........ | ........ |
| 2 | 83 | ........ | ........ | ........ | ........ | ........ | ........ | 92·7 | ........ |
| 2 | 88 | ........ | ........ | ........ | ........ | ........ | 95·5 | ........ | ........ |
| 1 | 100 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 92·4 |

## RATIONS D AND F.—OATS, PEASE AND BARLEY IN EQUAL PARTS.

The percentages of olein of the twenty-four animals fed with the above ration will now be discussed. These pigs furnished the finest quality of pork of all those under experiment; the fat, for the most part, was exceedingly firm and even in thickness, about one and one-quarter inches in the finished animal. Growth was continuous and normal.

Notwithstanding the varying conditions of the trial, all the pigs on this most satisfactory ration gave a uniformly low olein content :

*Finished Pigs.*

| | Percentage of Olein. |
|---|---|
| Soaked grain | 67 2 |
| Dry grain | 67·7 |
| Eastern pigs | 67·9 |
| Western pigs | 67·0 |
| Inside | 67·0 |
| Outside | 67·9 |

The average, 67·5 per cent, places these pigs in the 'very firm' class.

The inspection ratings are as follow :—

| | V.F | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| Soaked grain | 3 | 3 | 1 | 1 | .. |
| Dry grain | 1 | 4 | 1 | 2 | .. |
| Eastern pigs | 3 | 1 | .. | 3 | .. |
| Western pigs | 1 | 6 | 1 | .. | .. |

The immature pigs, as might be inferred from what has already been stated, gave a softer fat. The averages are subjoined :—

*Immature Pigs.*

| | Percentage of Olein. |
|---|---|
| Soaked grain | 74·5 |
| Dry grain | 81·8 |
| Eastern pigs | 76·4 |
| Western pigs | 79·2 |
| Inside | 82·6 |
| Outside | 70·9 |

Their inspection ratings are as follow :—

| | V.F | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| Soaked grain | .. | 2 | .. | .. | 1 |
| Dry grain | .. | .. | .. | .. | 3 |
| Eastern pigs | .. | 1 | .. | 1 | 2 |
| Western pigs | .. | 1 | .. | 1 | 1 |

## TABLE IX.

RATION D and F.—Oats, Pease and Barley, one-third each.

| No. of Pigs. | Dressed Weight. | Percentage of Olein. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Soaked. | | | | Dry. | | | |
| | | Inside. | | Outside. | | Inside. | | Outside. | |
| | | East. | West. | East. | West. | East. | West. | East. | West. |
| | Lbs. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. |
| 1 | 71 | 76·7 | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| 1 | 60 | ...... | ...... | 67·2 | ...... | ...... | ...... | ...... | ...... |
| 1 | 65 | ...... | 84·6 | ...... | ...... | ...... | ...... | ...... | ...... |
| 1 | 67 | ...... | ...... | ...... | 69·4 | ...... | ...... | ...... | ...... |
| 2 | 130 | 67·1 | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| 2 | 131 | ...... | ...... | 68·7 | ...... | ...... | ...... | ...... | ...... |
| 2 | 134 | ...... | 65·7 | ...... | ...... | ...... | ...... | ...... | ...... |
| 2 | 125 | ...... | ...... | ...... | 67·4 | ...... | ...... | ...... | ...... |
| 1 | 69 | ...... | ...... | ...... | ...... | 85·6 | ...... | ...... | ...... |
| 1 | 67 | ...... | ...... | ...... | ...... | ...... | ...... | 76·2 | ...... |
| 1 | 69 | ...... | ...... | ...... | ...... | ...... | 83·6 | ...... | ...... |
| 2 | 133 | ...... | ...... | ...... | ...... | 68·8 | ...... | ...... | ...... |
| 2 | 132 | ...... | ...... | ...... | ...... | ...... | ...... | 67·0 | ...... |
| 2 | 125 | ...... | ...... | ...... | ...... | ...... | 66·4 | ...... | ...... |
| 2 | 134 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 68·4 |

## RATION G.—BEANS, ONE PART ; SHORTS, THREE-QUARTER PART.

This pen comprised ten pigs. They were all of eastern origin, and weighed at the time of slaughtering from 148 to 205 pounds. The lowest percentage of olein was 79·6; the highest, 92·6. It is thus evident that all would be classed, by olein, as 'very soft.' The inspection rating placed the majority as 'soft.' The growth of the pigs was much below normal, the carcase was meagre and showed very little fat, and that of an extremely oily nature. From every point of view this ration seems most undesirable.

## RATION I AND H.—FIRST PERIOD—HALF CORN MEAL ; HALF OATS, PEASE AND BARLEY, EQUAL PARTS. SECOND PERIOD—CORN MEAL.

In this ration, half the grain of the first period and all the grain of the second period was corn meal. The effect of this is apparent upon the consistency of the fat. In ration A and B half the grain of the ration throughout life was corn meal, resulting in an average percentage of olein in the mature pigs of 73·2. In the ration

under discussion the average percentage of olein is 77·9. This means an increase of 4¾ per cent olein, due to replacing the oats, pease and barley of the second period by corn. The pens I and H comprised thirty-two pigs. The olein percentages under the varying conditions are as follow :—

| | Percentage of Olein. |
|---|---|
| Boiled grain .... .... .... .... .... .... .... .... | 79·0 |
| Dry grain .... .... .... .... .... .... .... .... .. | 76·7 |
| Eastern pigs .... .... .... .... .... .... .... .... | 78·6 |
| Western pigs .... .... .... .... .... .... .... .... | 77·2 |
| Inside .... .... .... .... .... .... .... .... .... .. | 77·8 |
| Outside .... .... .... .... .... .... .... .... .... | 77·9 |
| Average of all.. .... .... .... .... .... .... .... | 77·9 |

Inspection ratings :—

| | V.F | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| Boiled grain .. .... .... .... | .. | 2 | 3 | 9 | 2 |
| Dry grain .... .... .... .... | 1 | 3 | .. | 6 | 6 |
| Eastern pigs.. .... .... .... | 1 | 5 | 2 | 6 | 2 |
| Western pigs.. .... .... .... | .. | 1 | 1 | 10 | 4 |
| Inside.... .... .... .... .... | 1 | 2 | 1 | 9 | 3 |
| Outside .... .... .... .... .. | .. | 2 | 3 | 8 | 3 |

TABLE X.

Ration I and H.—First period, one-half Corn Meal, one-half Oats, Pease and Barley in equal parts; second period, Corn Meal.

| No. of Pigs. | Dressed Weight. | Percentage of Olein. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Boiled. | | | | Dry. | | | |
| | | Inside. | | Outside. | | Inside. | | Outside. | |
| | | East. | West. | East. | West. | East. | West. | East. | West. |
| | Lbs. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c, | p. c. | p. c. |
| 4 | 125 | 80·8 | ......... | ......... | ......... | ......... | ......... | ......... | ......... |
| 4 | 130 | ......... | ......... | 79·5 | ......... | ......... | ......... | ......... | ......... |
| 4 | 130 | ......... | 78·3 | ......... | ......... | ......... | ......... | ......... | ......... |
| 4 | 132 | ......... | ......... | ......... | 77·5 | ......... | ......... | ......... | ......... |
| 4 | 132 | ......... | ......... | ......... | ......... | 74·7 | ......... | ......... | ......... |
| 4 | 137 | ......... | ......... | ......... | ......... | ......... | ......... | 79·2 | ......... |
| 4 | 137 | ......... | ......... | ......... | ......... | ......... | 77·5 | ......... | ......... |
| 4 | 133 | ......... | ......... | ......... | ......... | ......... | ......... | ......... | 75·5 |

## RATION J. AND L.—FIRST PERIOD—CORN MEAL.
## SECOND PERIOD—OATS, PEASE AND BARLEY, EQUAL PARTS.

In planning this ration it was thought that any softening effect of the corn during the first period might be counteracted by using a grain feed not containing corn in the second or finishing period.

This has proved to be true to a large extent, as will be seen by comparing the average percentage of olein from the corn ration (Table VII.), namely, 92·3 with that obtained under consideration, 77·6. Nevertheless, our data show conclusively that when the animal is fed to a weight of 100 pounds on corn exclusively, the corrective action of such an excellent ration as oats, pease and barley is not sufficient to render the fat firm. Indeed, the olein values are very close to those obtained with ration I and H, just discussed.

| | Percentage of Olein. |
|---|---|
| Soaked grain | 76·4 |
| Dry grain | 78·8 |
| Eastern pigs | 76·4 |
| Western pigs | 78·9 |
| Inside | 76·5 |
| Outside | 78·7 |
| Average of all | 77·6 |

Inspection ratings—

| | V.F | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| Soaked grain | .. | 3 | 1 | 4 | .. |
| Dry grain | .. | 1 | 1 | 5 | 1 |
| Eastern pigs | .. | 4 | 2 | 2 | .. |
| Western pigs | .. | .. | .. | 7 | 1 |
| Inside | .. | 2 | 2 | 4 | .. |
| Outside | .. | 1 | .. | 6 | 1 |

TABLE XI.

RATION J and L.—1st Period, Corn Meal; 2nd Period, Oats, Pease and Barley, in equal parts.

| No. of Pigs. | Dressed Weight. | Percentage of Olein. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Soaked. | | | | Dry. | | | |
| | | Inside. | | Outside. | | Inside. | | Outside. | |
| | | East. | West. | East. | West. | East. | West. | East. | West. |
| | Lbs. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. |
| 2 | 135 | 70·7 | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 2 | 125 | ........ | ........ | 76·6 | ........ | ........ | ........ | ........ | ........ |
| 2 | 127 | ........ | 80·5 | ........ | ........ | ........ | ........ | ........ | ........ |
| 2 | 137 | ........ | ........ | ........ | 77·9 | ........ | ........ | ........ | ........ |
| 2 | 149 | ........ | ........ | ........ | ........ | 77·4 | ........ | ........ | ........ |
| 2 | 130 | ........ | ........ | ........ | ........ | ........ | ........ | 80·8 | ........ |
| 2 | 125 | ........ | ........ | ........ | ........ | ........ | 77·4 | ........ | ........ |
| 2 | 128 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 79·6 |

## RATION K AND M.—FIRST PERIOD—OATS, PEASE AND BARLEY, IN EQUAL PARTS.

### SECOND PERIOD—CORN MEAL.

This ration is the reverse of the preceding, corn meal being used as the finishing instead of the initial grain. The result was a firmer fat, containing 3·5 per cent (average) less olein. The fat of the greater number of the pigs, however, showed too much oiliness to allow the pork to be classed as of first quality.

| | Percentage of Olein. |
|---|---|
| Soaked grain | 73·5 |
| Dry grain | 74·4 |
| Eastern pigs | 74·4 |
| Western pigs | 73·4 |
| Inside | 73·0 |
| Outside | 74·8 |
| Average of all | 73·9 |

Inspection ratings—

| | V.F | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| Soaked grain | 1 | 1 | 1 | 4 | 1 |
| Dry grain | .. | 2 | 3 | 3 | .. |
| Eastern pigs | 1 | 1 | 2 | 4 | .. |
| Western pigs | .. | 2 | 2 | 3 | 1 |
| Inside | .. | 1 | 3 | 3 | 1 |
| Outside | .. | 3 | 4 | .. | 1 |

TABLE XII.

Ration K and M.—1st Period, Oats, Pease and Barley, in equal parts; 2nd period, Corn Meal.

| No. of Pigs. | Dressed Weight. | Percentage of Olein. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Soaked. | | | | Dry. | | | |
| | | Inside. | | Outside. | | Inside. | | Outside. | |
| | | East. | West. | East. | West. | East. | West. | East. | West. |
| | Lbs. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. |
| 2 | 139 | 74·2 | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 2 | 137 | ........ | ........ | 76·2 | ........ | ........ | ........ | ........ | ........ |
| 2 | 129 | ........ | 70·4 | ........ | ........ | ........ | ........ | ........ | ........ |
| 2 | 134 | ........ | ........ | ........ | 73·0 | ........ | ........ | ........ | ........ |
| 2 | 136 | ........ | ........ | ........ | ........ | 70·3 | ........ | ........ | ........ |
| 2 | 130 | ........ | ........ | ........ | ........ | ........ | ........ | 76·8 | ........ |
| 2 | 142 | ........ | ........ | ........ | ........ | ........ | 77·2 | ........ | ........ |
| 2 | 135 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 73·1 |

## CONDITIONS UNDER WHICH THE PIGS WERE FED CONSIDERED AS FACTORS.

Before discussing the three last rations of this series, N, O, and P, which were fed to eastern animals, we may consider to what extent the condition of the grain (soaked or dry), the locality or district in which the pigs were littered, and the amount of exercise obtainable, may have had upon the quality of the pork.

The inferences on these points are drawn from the olein content, that being undoubtedly the most reliable factor from which to make deductions. Finished animals only are considered.

*Boiled as against dry grain.*—In the sets of experiments A and B, half corn meal, half oats, pease and barley, boiled and dry, and I and H, first period, half corn meal, half oats, pease and barley, boiled and dry, we find that the fat produced from boiled grain in each case was the softer. In A and B the difference was 2·2 per cent olein, in I and H, the difference was 2·3 per cent olein.

*Soaked as against dry grain.*—This comparison was made with corn meal (C and E), a mixture of oats, pease and barley, (D and F), with rations employing during the first period corn meal, and second period oats, pease and barley (J and H), and lastly, first period, oats, pease and barley ; second period, corn meal (K and M). The results are :

Percentages of olein—

| | C & E | D & F. | J & H. | K & M. |
|---|---|---|---|---|
| Soaked.. .... .... .... ..... .. | 92·5 | 67·2 | 76·4 | 73·5 |
| Dry .... .... .... .... .... .... | 92·1 | 67·7 | 78·8 | 74·4 |

We scarcely feel justified, from these data, in drawing any conclusions as to the relative effect on firmness of the same grain ration, fed soaked or dry. A study of the individual results does not reveal any definite tendency, and most probably the condition of the grain in this respect has but little, if any, effect on the quality of the pork.

*Eastern origin as against western.*—This feature was allowed for under all the rations tested. The averages are in the order as discussed :—

| | A & B. | C & E. | D & F. | I & H. | J & L. | K & M. |
|---|---|---|---|---|---|---|
| Eastern origin .. .... | 73·4 | 91·2 | 67·9 | 78·6 | 76·4 | 74·4 |
| Western origin .. .... | 73·0 | 93·4 | 67·0 | 77·2 | 78·9 | 73·4 |

In four cases out of the six, the olein of the eastern pigs is somewhat the greater, and taken together the averages give a total excess of 3·7 per cent olein over the corresponding western groups. In two cases the western pigs show the larger olein per cent, amounting to 4·7 per cent olein over the corresponding eastern groups. These facts do not warrant us in supposing that there is any marked tendency towards softness in finished pigs due simply to western origin, as is thought by some packers. If finished pigs from the western part of Ontario are softer than those from the eastern, it must be due to the character of the feed they obtain.

*Inside as against Outside.*—As already explained, the pigs denoted as 'inside' are held to have had opportunities for limited exercise only, that is, in the small yards attached to the pens of the piggery; the 'outside' pigs had the run of an inclosure in which there was a movable sty or shelter for their accommodation at night.

The averages are as follow :—

Percentages of olein—

| | A & B. | C & E. | D & F. | I & H. | J & L. | K & M. |
|---|---|---|---|---|---|---|
| Inside ............. .... | 71·9 | 92·3 | 67·0 | 77·8 | 76·5 | 73·0 |
| Outside.... ..... ..... | 74·5 | 92·3 | 67·9 | 77·9 | 78·7 | 74·8 |

In several of these instances, it will be seen, the results are practically identical (for differences of less than one per cent must not be considered as forming a sufficiently strong basis from which to draw conclusions) ; in the other cases, the larger amount of olein appears in the fat of the 'outside' pigs. There can be no doubt as to the value of a sufficiently large run for young and growing pigs ; exercise to a limited extent in the earlier period of an animal's life is essential to a strong and thrifty growth, to good digestion and assimilation of the food.

We, therefore, do not think it wise, without further evidence, to draw the conclusion that the larger area for exercise had any injurious effect on the quality of the pork. Indeed, a survey of the two seasons' results makes it very clear that the character of the food is the one great influencing factor, and that the varying features or conditions, other than the ration, had very little to do with the relative firmness of the resulting fat.

## RATION N, O AND P.—N.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, EQUAL PARTS. DRY.
## O.—GRAIN AS IN N. PLUS MANGELS.
## P.—GRAIN AS IN N. PLUS STEAMED CLOVER.

This experiment comprising six pigs under each ration, was instituted to ascertain what the effect would be upon the relative firmness by adding (*a*) mangels, and (*b*) steamed clover to the grain ration, which, it will be noticed, is the same as under tests A and B. It is thus seen that B and N are duplicate tests in every particular. For this reason, it will be instructive to place the averages of A and B with those from the rations under discussion :

| | Percentage of Olein. |
|---|---|
| Ration B, average of 12 pigs | 73·1 |
| " N " 6 pigs | 73·7 |
| " O " 6 pigs | 74·9 |
| " P " 6 pigs | 76·1 |

By the olein test, B and N are practically identical. The addition of mangels somewhat raised the percentage of olein, but perhaps not to a degree sufficient to warrant any statement as to their effect upon the pork. The steamed clover, however, appeared to notably increase the olein. Very few of the carcases from these rations fall into the classes of firm and moderately firm, the influences of the corn (forming half the grain ration) being apparent.

The inspection ratings are as follow :—

| | V.F. | F. | M.F. | S. | V.S. |
|---|---|---|---|---|---|
| N | .. | 2 | 3 | 1 | .. |
| O | .. | 1 | 1 | 4 | .. |
| P | .. | .. | 4 | 2 | .. |

## SECOND SERIES OF FEEDING TRIALS, 1900.

On the completion of the work of the first set of experiments, it was thought desirable to institute a further series to obtain corroboration of certain results, as well as to ascertain the influence of several modifications in the rations already employed. In this second series, the effect of the ration on the fat of the finished pig simply was determined. Further, it was considered unnecessary to repeat the details as regards eastern and western origin, limited and unlimited ration, exercise, &c., these factors, it having been shown, possessing little, if any, influence on the relative firmness of the resulting pork. It was also decided to examine chemically the fat taken from above the shoulder only, the difference in olein content between the shoulder and loin fat from the same carcase being, as a rule, extremely small. We have, therefore to consider in the trials about to be discussed the percentage of olein in the rendered shoulder fat, the melting point of the fat, and the inspection ratings taken at the packing house.

An improved and more accurate method of taking the melting points having been perfected in our laboratories during the winter of 1899-1900, it will be found that there is a closer agreement in this second series between the olein content and the melting point of the fat than is apparent in the data of the first series. The scheme of rations is detailed as follows :—

### RATIONS.

1.....Oats, pease and barley, ⅓ each.

2.....Corn meal.

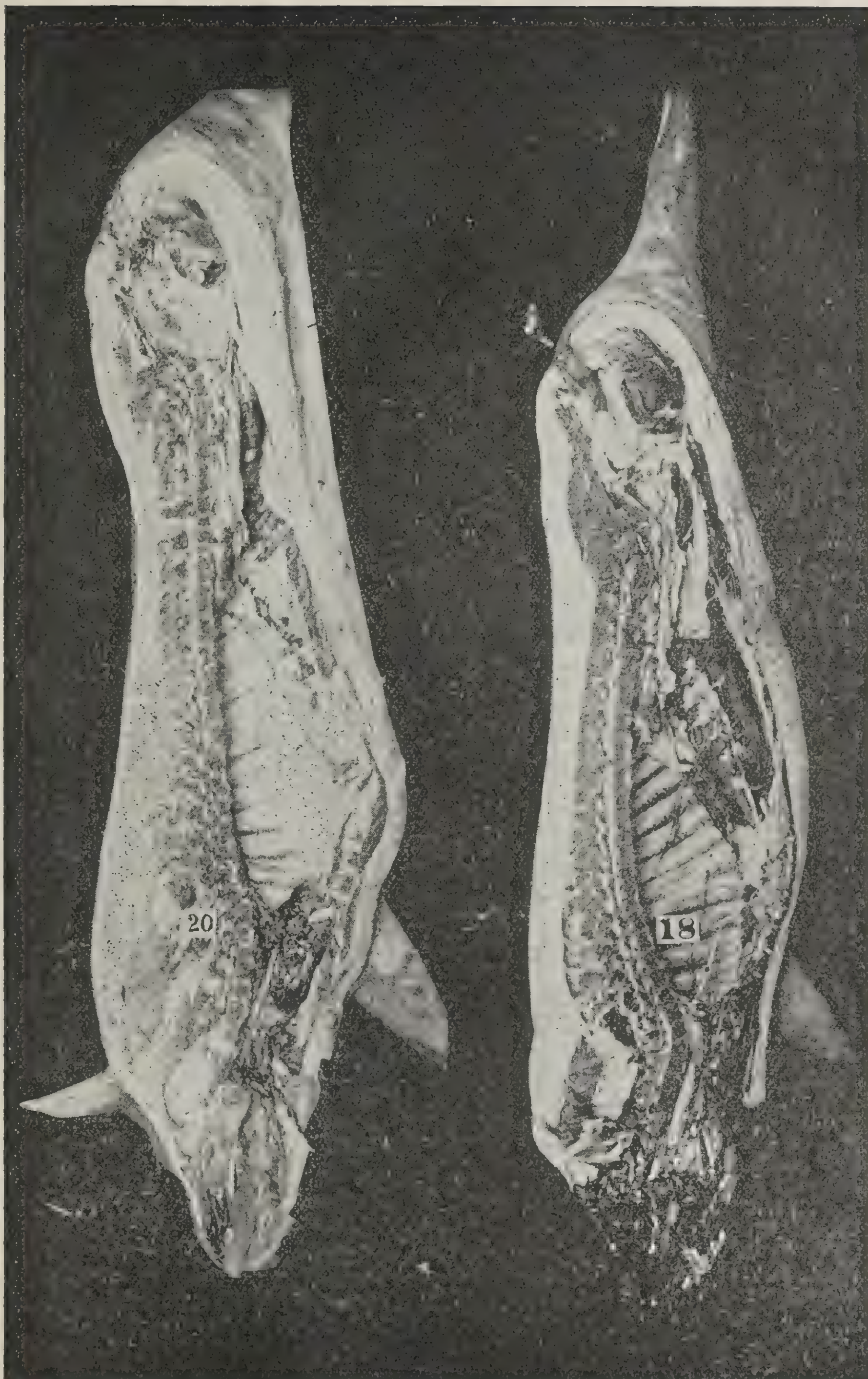
3.....Corn meal and skim-milk.

4.....Pease.

5.....Beans.

6.....½ corn meal.
½ oats, pease and barley, ⅓ each.

7.....½ corn meal.
½ oats, pease and barley, ⅓ each, plus skim milk.




No. 20 { Half corn meal.
Half oats, pease and barley

No. 18 { 1st period, half corn meal; half oats, pease and barley.
2nd period, corn meal.

8......First Period—½ corn meal ; ½ oats, pease and barley, ⅓ each.
Second Period—Corn meal.

9......First Period—Oats, pease and barley, ⅓ each.
Second Period—Corn meal.

10......½ corn meal ; ½ oats, pease and barley, ⅓ each.
Pastured first on rape, finally on artichokes.

11......First Period—½ corn meal ; ½ oats, pease and barley, ⅓ each. Pastured on rape.
Second Period—Same grain ration, plus raw pumpkins

12......½ corn meal ; ½ oats, pease and barley, ⅓ each, plus cooked pumpkins.

13......½ corn meal ; ½ oats, pease and barley, ⅓ each. From October 16, ½ corn meal, ½ pease.

14......½ corn meal ; ½ oats, pease and barley, plus artichokes.

15......First Period—Pastured on clover.
Second Period—From October 30, fed clover, plus ½ corn meal, ½ oats, pease and barley, ⅓ each.

16......First Period—Corn meal.
Second Period—Oats, pease and barley, ⅓ each.

17......A—½ corn meal ; ½ oats, pease and barley, ⅓ each, skim-milk and turnips.
B—½ corn meal ; ½ oats, pease and barley, ⅓ each, skim-milk and mangels.
C—½ corn meal ; ½ oats, pease and barley, ⅓ each, skim-milk and sugar beets.

Comparing the foregoing with the rations of the first series, it will be observed that the experiments with the following were duplicates : (*a*) the oats, pease and barley mixture, (*b*) corn only, (*c*) half corn, half oats, pease and barley mixture, (*d*) first period, corn meal ; second period, oats, pease and barley mixture ; (*e*) first period, oats, pease and barley mixture ; second period, corn meal ; (*f*) first period, half corn, half oats, pease and barley mixture ; second period, corn meal ; and (*g*) beans. In addition to these, the following rations found a place : (*a*) pease, (*b*) corn meal and skim-milk, (*c*) half corn meal, half oats, pease and barley mixture and skim milk, and several rations in which the grain was half corn meal, half oats, pease and barley with (*a*) pumpkins, (*b*) artichokes, (*c*) rape, (*d*) clover, and three pens with this same grain ration plus skim milk and mangels, turnips and sugar beets, respectively.

In Table XIII. we have arranged the rations in order of olein content, beginning with the firmest pork.

TABLE XIII.—AVERAGES from Determinations of 2nd Series, 1900.

| No. of Ration. | Composition of Ration. | Olein. | Melting Point. |
|---|---|---|---|
| 17 C | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease, barley, $\frac{1}{3}$ each and skim milk, sugar beets | 66·9 | 32·3 |
| 4 | Pease | 67·2 | 32·5 |
| 17 B | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease, barley, $\frac{1}{3}$ each skim milk and mangels | 68·2 | 32·7 |
| 1 | Oats, pease and barley, $\frac{1}{3}$ each | 68·7 | 32·4 |
| 17 A | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease, barley, $\frac{1}{3}$ each and skim milk; turnips | 70·4 | 32·3 |
| 3 | Corn meal and skim milk | 70·9 | 33·3 |
| 7 | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease, barley, $\frac{1}{3}$ each and skim milk | 72·3 | 31·1 |
| 13 | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley $\frac{1}{3}$ each. From Oct. 16, $\frac{1}{2}$ corn meal, $\frac{1}{2}$ pease. | 72·3 | 31·2 |
| 12 | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease, barley, $\frac{1}{3}$ each and cooked pumpkins | 73·3 | 31·4 |
| 14 | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease, barley and artichokes | 73·4 | 31·5 |
| 9 | 1st period: oats, pease, barley $\frac{1}{3}$ each; 2nd period, corn meal | 73·9 | 31·1 |
| 11 | 1st period: pastured on rape, $\frac{1}{2}$ corn meal, $\frac{1}{2}$ oats, pease and barley $\frac{1}{3}$ each; 2nd period, raw pumpkins and same grain | 74·2 | 31·6 |
| 6 | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats; pease and barley, $\frac{1}{3}$ each | 74·6 | 30·3 |
| 10 | $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each; pastured first on rape, finally on artichokes | 74·9 | 32·4 |
| 16 | 1st period: corn meal; 2nd period, oats, pease and barley, $\frac{1}{3}$ each | 76·1 | 30·9 |
| 15 | Pastured on clover, From Oct 30, fed clover, $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each | 76·1 | 30·3 |
| 8 | 1st period: $\frac{1}{2}$ corn meal; $\frac{1}{2}$ oats, pease and barley, $\frac{1}{3}$ each; 2nd period, corn meal. | 77·9 | 30·8 |
| 2 | Corn meal only | 83·6 | 28·6 |
| 5 | Beans | 84·9 | 29·5 |

## RATION No. 1.—OATS, PEASE AND BARLEY, IN EQUAL PARTS.

In all the pigs of this pen the fat was very firm, not too thick and of even deposition.

By inspection rating, all were classed as 'very firm'; by olein content, three would be 'very firm' and two 'firm.'

The average percentage of olein from the present ration indicates a very high quality of pork and is practically identical with that obtained in the first series. This is undoubtedly from every standpoint a most satisfactory ration.

## RATION No. 2.—CORN MEAL.

The results with corn meal used exclusively are, as in the ration just considered, in close agreement with those of the same ration under the first series, though in the former test the average percentage of olein was somewhat higher, probably owing to the pigs being younger when the feeding was commenced. In the pen of the second series the animals when put upon the ration were about one month older than those of the first series, and this undoubtedly led to a better, quicker and more normal growth.

We have, therefore, in this second test with corn meal ample corroboration for our conclusions as to the disastrous effect of this ration (see page 19) and its unsuitability in pig feeding. All the pigs, both by olein content and inspection rating, were classed as 'very soft.'

## RATION No. 3.—CORN MEAL AND SKIM MILK.

This ration has afforded us some of the most striking results in the whole series. The effect of the skim milk in hardening the fat of these corn fed pigs has been most remarkable. Skim milk, it is seen, has placed these pigs well up on the list of averages. Corn meal without this corrective gave such an exceedingly soft pork that the pigs in the first series are last, and in the second series next to last in the order of merit. With skim milk, the growth was much more rapid and thrifty than with corn meal only (as will be seen from the illustration given of these pens), and this, no doubt, is largely due to the nitrogenous nutrients furnished by the milk, and which, as we have before remarked, are to a great extent lacking in corn, which supplies, essentially, starch and oil. This ration (No. 3) is not, however, so suitable as one of mixed grains (oats, pease and barley) for pork production, for in several of the pigs of this set, the fat along the back was too thick. From our experiments we conclude, then, that while a ration of corn exclusively resulted in a very meagre growth and only a slight deposition of fat—and that of an extremely soft and oily character—the addition of a sufficiency of skim milk to supply the necessary nitrogenous matter tended to a rapid growth and the production of a fairly firm fat, which, however, in many instances, was too thick for the bacon trade. The present results are most valuable and important in showing the beneficial effect of skim milk in promoting a thrifty growth and in counteracting the softening effect of the corn upon the pork, but looking to economy of production, thickness and quality of fat, a mixed grain ration, such as we have referred to above, will, we believe, give better returns.

It would probably be hard to overestimate the value of skim milk as part of every ration, especially for young pigs ; the fact here brought out regarding its hardening effect upon the fat shows it to have an additional function of great importance.

The ratings by olein are : four firm, two moderately firm ; by inspection we have : one very firm, one firm, two moderately firm, one soft, one very soft. The average percentage of olein for the set is 70·9, which gives it a rank of 'moderately firm.'

## RATION No. 4.—PEASE.

Four of the six pigs in this group ranked 'very firm,' both by olein and inspection rating. Omitting one animal, regarding which we have some doubt, but the data of which have been allowed to stand in the table of details, the average percentage of olein for the group is 67·2, which places this ration practically at the head of our second series. The pigs made good growth, were well nourished, and the fat evenly deposited along the back (from 1¼ to 1½ inches thick) and extremely firm. These results confirm the good opinion generally held with regard to pease, and furnish proof of their desirability in the ration for obtaining the finest quality of pork.

## RATION No. 5.—BEANS.

As in the first series, all the pigs under this ration gave an extremely soft fat. The average percentage of olein was 84·9, that of the first series being 85·2—figures practically identical. Both by olein and inspection rating, the fat was classed as 'very soft.' We have in this pen, therefore, confirmatory evidence as to the unsuitableness of beans for fattening pigs. The deductions made from our first experiment with beans might be repeated for those of the second series (see page 22).

## RATION No. 6.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, IN EQUAL PARTS.

This is a repetition of ration A and B in the first series and the data obtained are in close accordance with those already recorded for this grain mixture. In the first series, the average percentage of olein was 73·2 ; in the second, 74·6, which places the group among those marked as 'soft.'

The present inspection ratings are :—One very firm, one firm, two moderately firm and two soft ; by olein content we have five of the six pigs on the line between soft and moderately firm, and one moderately firm.

Our results in this second series, therefore, confirm the conclusions already drawn, namely, that this ration continued throughout life has the tendency towards the production of a soft, oily fat.

## RATION No. 7.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, PLUS SKIM MILK.

This ration only differs from the preceding in the addition of skim milk. It had no counterpart in the first series. The skim milk here has had a corrective effect, though not in the same degree as when used with corn only. It lowered the average percentage of olein from 74·6 (see preceding ration) to 73·3, placing the group in 'moderately firm' instead of 'soft.' A study of the detailed data (see Table 7, page 44), reveals that the individuals of this pen varied considerably in olein content, and, further, that the agreement between olein ratings and inspection ratings is not so close as in most of the other groups. We can scarcely offer any good reason for this, but from a careful consideration of the whole matter, we feel confident in placing the greater weight upon the olein values. Very frequently examination after smoking the bacon has confirmed the lower olein values. By olein content we find practically four classed as 'firm,' one as 'soft,' and one as 'very soft.' By inspection rating we have three as very firm, one moderately firm and one soft.

## RATION No. 8.—FIRST PERIOD, HALF CORN MEAL, HALF OATS, PEASE AND BARLEY.

## SECOND PERIOD, CORN MEAL.

This is a duplicate of ration I and H of the first series, under which thirty-two animals were tested. It is perhaps a coincidence, though certainly one not to be lightly passed over, that the average percentage of olein in both series is the same, 77·9, and thus both groups, as such, are placed in the category of very soft.

Many of the pigs, as in the first series, had too thick a fat along the back. As with the preceding ration, considerable discrepancies are to be observed between the two classes of ratings of the individual animals, but the close accord of the olein values with those of the first series, leaves no doubt as to the character of the fat, and points unmistakably to the softening effect of this ration.

## RATION No. 9.—FIRST PERIOD, OATS, PEASE AND BARLEY IN EQUAL PARTS.

## SECOND PERIOD, CORN MEAL.

The results from this ration may be compared with those of K and M of the first series, the rations being the same. Here, again, we find the average olein content for the group to be the same in both series, namely, 73·9, and consequently the deductions already made might be repeated. In the majority of cases the fat

was too soft and oily to allow the pork to be classed as of first quality. It was also noticed, as in the first series, that most of the carcases showed too thick a deposition of fat. We receive in these data corroboration of the statement made when discussing the first series, that this ration gives a fat containing less olein than one in which corn meal forms half of the first period food, and consequently forms a part or whole of the ration throughout life.

### RATION No. 10.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, IN EQUAL PARTS. PASTURED FIRST ON RAPE AND FINALLY ON ARTICHOKES.

This is seen to be the same grain ration as No. 6 of this second series, the difference being in the addition of rape and artichokes. The average percentage of olein for the group is 74·9, being only three-tenths of a per cent more than that of the grain ration alone. It seems scarcely advisable, therefore, to make any inference as to the effect of the rape and artichokes, further than to say that these crops do not appear to correct in any degree the softening effect of the corn meal. The pigs of this group showed a tendency to develop too thick a shoulder fat.

### RATION No. 11.—FIRST PERIOD, HALF CORN MEAL, HALF OATS, PEASE AND BARLEY MIXTURE, PASTURED ON RAPE.

### SECOND PERIOD, SAME GRAIN RATION AND RAW PUMPKINS.

This ration differs only from the preceding in the substitution of raw pumpkins for artichokes in the second period. The differences in the consistency of the fat of the individual pigs are not large. The average percentage of olein is 74·2. This is a fraction of a per cent less than in No. 6, in which the same grain ration was continued throughout without rape or pumpkins. While, therefore, it is impossible to say that these forage crops had any very marked effect in correcting the softening action of the corn meal, we can at least state they did not increase the softness of the pork.

### RATION No. 12.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY MIXTURE, AND COOKED PUMPKINS.

This group of pigs gave a somewhat lower percentage of olein—indicating a firmer fat—than most of the others on the same grain ration, the majority of them falling into the firm and moderately firm groups. The average percentage of olein for the group is 73·3, practically the provisional limit for the moderately firm class.

### RATION No. 13.—FIRST PERIOD, HALF CORN MEAL, HALF OATS, PEASE AND BARLEY.

### SECOND PERIOD, HALF CORN MEAL, HALF PEASE.

Three of the five pigs of this group were classed by their olein content as 'firm,' one as moderately firm and one as soft. The average percentage of olein for the group was 72·3, placing the group equal in the scale of firmness with that from Ration No. 7. The inspection ratings gave three as 'very firm' and two as 'moderately firm.' If compared with No. 6 the good effect of the pease (forming half of the ration of the second period) is noticeable.

## RATION No. 14.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY IN EQUAL PARTS AND ARTICHOKES.

The results of this ration are practically the same as those from No. 12, the average olein content for the two groups being 73·3 and 73·4 respectively. By the percentage of olein, one was classed 'firm,' two 'moderately firm,' and two 'soft.'

## RATION No. 15.—FIRST PERIOD, PASTURED ON CLOVER. SECOND PERIOD, HALF CORN MEAL, HALF OATS, PEASE AND BARLEY AND CLOVER PASTURAGE.

As will be seen from the table of data, this is a very uneven group as regards olein content ; three would be classed as very soft, one as moderately firm, and two as firm. The average olein content is 76·5, placing the group well down in the order of firmness. The olein average for the group (No. 6) on this grain ration without clover is 74·6. These data appear to indicate, therefore, that clover has a softening effect when continued throughout the whole feeding period. Comparing the olein content of this group with that of pen P of the first series, fed with the same grain mixture plus steamed clover, we find very little difference—the latter being 76·1 per cent—and this fact strengthens our opinion that clover increases the percentage of olein. Clover could possibly be used without detriment in more limited quantities, especially if used in conjunction with skim milk.

## RATION No. 16.—FIRST PERIOD, CORN MEAL. SECOND PERIOD, OATS, PEASE AND BARLEY, IN EQUAL PARTS.

This ration is the reverse of No. 9 of the present series and a repetition of J and L of the first series.

As in the previous set of experiments, we find that corn meal fed during the first period (till the animal weighed 100 pounds) and finally oats, pease and barley, produced a somewhat softer fat than when corn is fed in the finishing period, preceded by oats, pease and barley.

Compared with the former data from the same ration, the present results show a somewhat firmer fat, the percentage of olein being 76·0 as against 77·6 ; the difference, however, is not sufficient to raise the group from the class of 'very soft,' in which the first set of pigs on this ration was placed.

## RATION No. 17.—A.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, SKIM MILK AND TURNIPS.
## B.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, SKIM MILK AND MANGELS.
## C.—HALF CORN MEAL, HALF OATS, PEASE AND BARLEY, SKIM MILK AND SUGAR BEETS.

The grain mixture for these groups, it will be observed, is the same as that which has been employed in a number of the experiments. Skim milk, however, has been fed to all the pigs throughout life and various roots—as indicated above—tried in the subdivisions, each of which comprised four animals. The results obtained have been satisfactory, the growth was good, the fat very firm and as a rule not too thick. From the table of averages (page 30) it will be observed that these three groups stand well at the head in the scale of firmness. The olein and inspection ratings are closely concordant, placing the animals in the classes of 'very firm' or 'firm.'

Group 'B' is the same as ration 'O' of the first series, save that in the present trial skim milk was fed. The difference in the olein content—6·7 per cent—in favour of Ration 17, Group 'B,' may, I think, be fairly attributed to the effect of the skim milk. Of the three groups, that with sugar beets gave the firmest fat; that with turnips, the least firm.

*In all three groups we have confirmed in the most marked manner the corrective and beneficial action of skim milk, which was more particularly referred to when discussing the corn and skim milk ration.*

## CONCLUSIONS FROM SECOND SERIES OF EXPERIMENTS.

On page 15 we have given the chief inferences to be drawn from the results of the first set of experiments. In all important features these deductions receive strong confirmation from the data of the second series. There are, however, from this latter series several additional and important features to be noted. The first is with regard to the use of skim milk in conjunction with the grain ration. **In every instance in which it has been tried, skim milk has produced a much firmer fat than resulted from the same grain ration, fed without skim milk.** The softening effect of corn, so repeatedly referred to, has in a very large measure been counteracted by this means. Therefore, while our results point to the injurious effects of a ration containing one-half or more corn without skim milk, we have to record that its use as a part of the grain ration in conjunction with skim milk has produced an excellent quality of pork. It will have been noticed, however, in the discussion of several of the rations, that a large proportion of corn in the ration tends to an increase in the deposition of fat, especially above the shoulder.

Clover has not been tried save in conjunction with a grain ration, half of which was corn meal. We are scarcely in a position, therefore, to speak positively as to its effect upon the relative firmness, but there are certainly strong indications that its influence is in the same direction as corn, increasing the percentage of olein.

It is quite evident that the root crops—turnips, mangels and sugar beets—can be used with benefit and with impunity in such a ration as we have in No. 17, the animals of which produced a first quality pork.

Further, we do not notice any softening effect due to the results of feeding rape, artichokes, or pumpkins, cooked or raw.

## SUMMARY.

Among the more important conclusions to be drawn from this investigation are the following :—

**1. That the one great controlling factor in the quality of the pork of finished pigs lies in the character of the food employed.**

**2. That Indian corn and beans tend to softness, *i.e.*, to increase the percentage of olein in the fat. If these grains are used they must be fed judiciously if first class firm pork is to be produced. If fed in conjunction with skim milk it has been shown that a considerable proportion of Indian corn may be used in the grain ration without injuring the quality of the pork.**

3. That a grain ration consisting of a mixture of oats, pease and barley, in equal parts, gives a firm pork of excellent quality.

4. That skim milk not only tends to thriftiness and rapid growth, but counteracts in a very marked manner any tendency to softness.

5. That rape, pumpkins, artichokes, sugar beets, turnips and mangels can be fed in conjunction with a good ration without injuring the quality of the pork.

6. That the fat of very young pigs and animals of unthrifty growth is softer than that of finished pigs that have increased steadily to the finishing weight.

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*As already indicated, there has been a very large amount of analytical work in connection with this investigation, and the writer is anxious to acknowledge with thanks his indebtedness to the assistant chemists, Mr. A. T. Charron and Mr. H. W. Charlton, by whom much of it was successfully undertaken. They rendered most efficient help in the prosecution of this research.

# APPENDIX

## SERIES 1.—RATION A.

½ Corn Meal........................ } Boiled.
½ Oats, Pease and Barley, in equal parts. }

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside. . | 68 | East.... | Oct. 26... | 98 | 67 | 77·3 | 32·7 | V. S. | V. S. |
| Outside. | 104 | " .... | Nov. 7.... | 102 | 67 | 77·1 | 31·6 | V. S. | V. S. |
| " | 106 | " .... | " 14.... | 96 | 61 | 81·2 | 28·6 | V. S. | V. S. |
| Inside. . | 2 | West... | Sept. 26.... | 103 | 66 | 91·6 | 32·3 | V. S. | V. S. |
| " | 61 | East.... | Nov. 21.... | 181 | 129 | 71·5 | 34·0 | S. | M. F. |
| " | 65 | " ... | Oct. 26.... | 180 | 127 | 73·9 | 34·6 | S. | S. |
| " | 66 | " .... | Dec. 5.... | 191 | 126 | 74·8 | 33·7 | S. | S. |
| " | 69 | " .... | Feb. 10.... | 181 | 125 | 71·8 | 34·5 | S. | M. F. |
| Outside. | 101 | " .... | Jan. 5.... | 211 | 145 | 71·8 | 32·6 | M. F. | M. F. |
| " | 105 | " .... | Feb. 3.... | 180 | 130 | 79·1 | 32·0 | S. | V. S. |
| " | 107 | " .... | Jan. 13.... | 205 | 140 | 75·9 | ...... | F. | S. |
| " | 109 | " .... | Feb. 3.... | 187 | 130 | 75·6 | 32·8 | S. | S. |
| Inside. . | 1 | West... | Nov. 14... | 183 | 130 | 71·5 | 34·5 | V. S. | M. F. |
| " | 4 | " .... | " 30.... | 180 | 118 | 71·5 | 32·8 | S. | M. F. |
| " | 8 | " ... | Jan. 13... | 188 | ......... | 78·9 | 33·9 | S. | V. S. |
| " | 10 | " ... | Nov. 14.... | 183 | 128 | 72·6 | 33·9 | V. S. | M. F. |
| Outside. | 42 | " ... | " 21.... | 190 | 126 | 69·7 | 34·6 | S. | F. |
| " | 45 | " ... | Oct. 30. .. | 183 | 124 | 72·5 | 33·5 | M. F. | M. F. |
| " | 48 | " ... | Dec. 29.... | 190 | 120 | 77·1 | 34·8 | F. | V. S. |
| " | 50 | " ... | " 29.... | 190 | 124 | 80·8 | 32·3 | S. | V. S. |

## RATION B.

½ Corn Meal........................ } Dry.
½ Oats, Pease and Barley, in equal parts. }

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside. . | 71 | East.... | Sept. 19.... | 96 | .......... | 88·1 | 32·6 | V. S. | V. S. |
| " .. | 78 | " .... | Oct. 30.... | 106 | 76 | 72·6 | 34·1 | S. | M. F. |
| Outside. | 115 | " .... | " 18.... | 106 | 65 | 77·9 | 32·5 | S. | V. S. |
| " .. | 119 | " .... | Nov. 7.... | 97 | 64 | 77·5 | 32·3 | S. | V. S. |
| Inside. . | 15 | West... | Sept. 19.... | 100 | .......... | 87·1 | 31·1 | V. S. | V. S. |
| " .. | 19 | " .... | " 19.... | 102 | .......... | 83·7 | 31·9 | S. | V. S. |
| Outside. | 59 | " .... | " 19.... | 105 | .......... | 83·2 | 32·2 | S. | V. S. |
| Inside. . | 74 | East.... | Oct. 18.... | 188 | 134 | 74·0 | 35·9 | S. | S. |
| " .. | 75 | " .... | Nov. 14.... | 204 | 146 | 67·8 | 33·5 | S. | V. F. |
| " .. | 77 | " .... | Jan. 20.... | 180 | 139 | 69·4 | 32·4 | S. | F. |
| " .. | 79 | " .... | " 20.... | 180 | 140 | 70·9 | 33·2 | S. | F. |
| Outside. | 113 | " .. . | " 5.... | 200 | 142 | 74·1 | 32·1 | S. | S. |
| " .. | 114 | " .... | Nov. 30.... | 182 | 134 | 70·8 | 32·1 | M. F. | F. |
| " .. | 118 | " .... | Jan. 5.... | 186 | 127 | 74·8 | 32·3 | S. | S. |
| " .. | 120 | " .... | Dec. 29.... | 212 | 154 | 78·2 | 33·3 | F. ? | V. S. |
| Inside. . | 14 | West... | Oct. 18.... | 182 | 130 | 67·1 | 38·2 | V. F. | V. F. |
| " .. | 13 | " .... | Nov. 14.... | 192 | 139 | 71·0 | 34·6 | S. ? | F. |
| " .. | 17 | " .... | Oct. 5.... | 182 | 127 | 72·1 | 34·5 | S. | M. F. |
| " .. | 20 | " .... | " 26.... | 184 | 135 | 72·5 | 34·4 | S. | M. F. |
| Outside. | 51 | " .... | Nov. 7.... | 211 | 149 | 70·4 | 35·3 | S. | F. |
| " .. | 53 | " .... | Oct. 18.... | 185 | 130 | 73·6 | 34·3 | V. S. | S. |
| " .. | 56 | " .... | Nov. 21.... | 188 | 137 | 71·6 | 32·8 | S. | M. F. |
| " .. | 58 | " .... | " 7.... | 186 | 133 | 75·1 | 32·4 | V. S. | S. |

## RATION C.

Corn Meal—Dry.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside. . | 85 | East. . . . | Dec. 21. . . . | 107 | . . . . . . . . . . | 90·9 | 27·9 | V. S. | V. S. |
| Outside. | 124 | " . . . . | " 8. . . . | 98 | 69 | 83·6 | 31·5 | V. S. | V. S. |
| Inside. . | 21 | West. . . | " 15. . . . | 108 | 76 | 88·3 | 29·3 | V. S. | V. S. |
| Outside. | 65 | " . . . | " 8. . . . | 102 | 72 | 82·9 | 29·7 | V. S. | V. S. |
| Inside. . | 84 | East. . . . | April 18. . . . | 63 | 46 | 96·7 | Too soft. . | V. S. | V. S. |
| " . . | 82 | " . . . . | Feb. 16. . . . | 180 | 134 | 79·2 | 32·0 | V. S. | V. S. |
| Outside. | 122 | " . . . . | May 7. . . . | 160 | 117 | 87·7 | Too soft . | V. S. | V. S. |
| " . . | 123 | " . . . . | April 17. . . . | 63 | 49 | 97·7 | " . . | V. S. | V. S. |
| Inside. . | 23 | West. . . | " 30. . . . | 140 | 100 | 95·3 | " . . | V. S. | V. S. |
| " . | 25 | " . . . | " 18. . . . | 111 | 76 | 94·6 | " . . | V. S. | V. S. |
| Outside. | 62 | " . . . | May 7. . . . | 127 | 100 | 92·4 | " . . | V. S. | V. S. |

## RATION D.

Oats, Pease and Barley, in equal parts—Dry.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside. . | 87 | East . . . | Sept. 19. . . . | 104 | 69 | 85·6 | . . . . . . . . | V. S. | V. S. |
| Outside. | 128 | " . . . | Oct. 30. . . . | 101 | 67 | 76·2 | 33·0 | V. S. | V. S. |
| Inside. . | 26 | West. . . | Sept. 19. . . . | 108 | 69 | 83·6 | 31·5 | V. S. | V. S. |
| " . . | 86 | East . . . | Nov. 7. . . . | 182 | 134 | 69·3 | 36·5 | M. F. | F. |
| " . . | 89 | " . . . | " 14. . . . | 184 | 132 | 68·3 | 34·1 | M. F. | V. F. |
| Outside. | 129 | " . . . | " 30. . . . | 188 | 127 | 66·4 | 34·0 | M. F. | V. F. |
| " . . | 130 | " . . . | Jan. 20. . . . | 180 | 137 | 67·6 | 34·6 | V. F. | V. F. |
| Inside. . | 29 | West. . . | Nov. 21. . . . | 181 | 125 | 67·6 | 35·2 | F. | V. F. |
| " . . | 30 | " . . . | " 30. . . . | 179 | 126 | 65·2 | 34·4 | F. | V. F. |
| Outside. | 66 | " . . . | " 14. . . . | 195 | 134 | 66·7 | 33·3 | F. | V. F. |
| " . . | 68 | " . . . | " 14. . . . | 188 | 134 | 70·1 | 32·7 | F. | F. |

## RATION E.

Corn Meal—Soaked.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside. . | 95 | East . . . | Dec. 21. . . . | 111 | 78 | 87·0 | . . . . . . . . . . | V. S. | V. S. |
| Outside. | 133 | " . . . | " 21. . . . | 115 | 83 | 84·5 | 30·2 | V. S. | V. S. |
| Inside. . | 32 | West. . . | Nov. 14. . . . | 95 | 63 | 84·2 | 31·0 | V. S. | V. S. |
| Outside. | 73 | " . . . | Dec. 8. . . . | 100 | 71 | 92·6 | 27·0 | V. S. | V. S. |
| Inside. . | 93 | East . . . | April 18. . . . | 64 | 45 | 97·3 | 24·5 | V. S. | V. S. |
| " . . | 94 | " . . . | Mar. 15. . . . | 178 | 140 | 87·0 | 28·7 | V. S. | V. S. |
| Outside. | 132 | " . . . | April 18. . . . | 80 | 55 | 98·9 | Too soft. | V. S. | V. S. |
| " . . | 134 | " . . . | May 7. . . . | 175 | 130 | 85·7 | 28·3 | V. S. | V. S. |
| Inside. . | 31 | West. . . | Feb. 16. . . . | 181 | 132 | 86·4 | 31·8 | S. | V S. |
| " . . | 35 | " . . . | April 18. . . . | 91 | 63 | 100·2 | Too soft. | V. S. | V. S. |
| Outside. | 74 | " . . . | May 28. . . . | 194 | 148 | 90·0 | 26·3 | V. S. | V. S. |
| " . . | 75 | " . . . | April 18. . . . | 100 | 72 | 93·7 | 27·0 | V. S. | V. S. |

## RATION F.

Oats, Pease and Barley in equal parts, soaked.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 100 | East.... | Oct. 10.... | 104 | 71 | 76·7 | 34·5 | S. | V. S. |
| Outside. | 139 | " ... | Nov. 7.... | 96 | 60 | 67·1 | 38·4 | F. | V. F. |
| Inside.. | 37 | West... | Sept. 19.... | 100 | .......... | 84·6 | 30·5 | V. S. | V. S. |
| Outside. | 76 | " ... | Oct. 5.... | 102 | 67 | 69·3 | 40·8 | F. | F. |
| Inside.. | 96 | East.... | Nov. 21.... | 179 | 122 | 68·5 | 35·3 | M. F. | V. F. |
| " .. | 99 | " ... | " 29.... | 195 | 138 | 65·7 | 37·1 | V. F. | V. F. |
| Outside. | 138 | " ... | Jan. 5.... | 195 | 128 | 67·5 | 36·6 | F. | V. F. |
| " .. | 140 | " ... | Dec. 29.... | 195 | 134 | 69·9 | 34·6 | V. F. | F. |
| Inside.. | 36 | West... | Oct. 30.... | 198 | 130 | 64·9 | 35·0 | V. F. | V. F. |
| " .. | 40 | " ... | Nov. 14.... | 198 | 137 | 66·4 | 35·0 | F. | V. F. |
| Outside. | 77 | " ... | " 30.... | 184 | 125 | 65·7 | 35·0 | M. F. | V. F. |
| " .. | 78 | " ... | Dec. 15.... | 179 | 125 | 69·1 | 33·9 | F. | F. |

## RATION G.

Beans, 1 part ; Shorts, $\frac{3}{4}$ part.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Outside. | 145 | East.... | Oct. 30.... | 109 | 66 | 83·9 | .......... | V. S. | V. S. |
| " .. | 148 | " ... | Dec. 29.... | 205 | 142 | 82·5 | 32·5 | S. | V. S. |
| " .. | 147 | " ... | Jan. 20.... | 180 | 130 | 81·0 | 32·9 | S. | V. S. |
| " .. | 150 | " ... | " 20.... | 180 | 129 | 83·5 | 30·5 | S. | V. S. |
| " .. | 143 | " ... | Feb. 3.... | 178 | 130 | 79·6 | 29·5 | S. | V. S. |
| " .. | 141 | " ... | " 16.... | 151 | 102 | 92·6 | Too soft. | V. S. | V. S. |
| " .. | 142 | " ... | " 16.... | 148 | 95 | 85·8 | .......... | V. S. | V. S. |
| " .. | 144 | " ... | " 16.... | 185 | 121 | 82·1 | ....... | S. | V. S. |
| " .. | 149 | " ... | " 16.... | 174 | 118 | 86·3 | 30·4 | S. | V. S. |
| " .. | 146 | " ... | " 10.... | 188 | 133 | 88·8 | 30·5 | M. F. | V. S. |

## RATION H.

1st Period .................. $\left\{\begin{array}{l}\frac{1}{2} \text{ Corn Meal.} \\ \frac{1}{2} \text{ Oats, Pease and Barley}\end{array}\right.$ Boiled.

2nd " ..................... Corn Meal.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 62 | East.... | Jan. 13.... | 184 | 130 | 80·5 | 31·5 | M.F. | V.S. |
| " .. | 63 | " ... | Dec. 5.... | 183 | 116 | 76·5 | 32·5 | S. | V.S. |
| " .. | 67 | " ... | April 30.... | 182 | 127 | 87·5 | 27·5 | V.S. | V.S. |
| " .. | 70 | " ... | Jan. 13.... | 180 | 125 | 78·7 | 33·0 | F. | V.S. |
| Outside. | 102 | " ... | " 13.... | 190 | 135 | 73·2 | 34·0 | M.F. | S. |
| " .. | 103 | " ... | Mar. 8.... | 183 | 136 | 77·0 | 33·0 | F. | V.S. |
| " .. | 108 | " ... | May 7.... | 175 | 122 | 88·4 | 25·1 | V.S. | V.S. |
| " .. | 110 | " ... | Mar. 15.... | 181 | 128 | 79·5 | 29·6 | S. | V.S. |
| Inside.. | 3 | West... | Dec. 5.... | 189 | 127 | 73·8 | 32·7 | S. | S. |
| " .. | 5 | " ... | Mar. 8.... | 182 | 134 | 84·6 | 30·2 | S. | V.S. |
| " .. | 7 | " ... | Feb. 10.... | 201 | 136 | 78·6 | 32·4 | S. | V.S. |
| " .. | 9 | " ... | Dec. 5.... | 183 | 124 | 76·2 | 32·2 | S. | V.S. |
| Outside. | 41 | " ... | " 21.... | 190 | 140 | 74·3 | ? | S. | S. |
| " .. | 43 | " ... | April 30.... | 172 | 126 | 84·0 | 28·0 | S. | V.S. |
| " .. | 46 | " ... | Jan. 13.... | 190 | 130 | 76·8 | 31·8 | M.F. | V.S. |
| " .. | 49 | " ... | " 20.... | 180 | 127 | 74·8 | 31·3 | S. | S. |

## RATION I.

1st Period ..... { ½ Corn Meal. ½ Oats, Pease and Barley in equal parts } Dry.
2nd " ...... orn Meal.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 73 | East.... | Jan. 5.... | 184 | 129 | 81.5 | 32·4 | S. | V.S. |
| " .. | 72 | " ... | " 13.... | 180 | 136 | 65·9 | 35·2 | V.F. | V.F. |
| " .. | 76 | " ... | " 13 ... | 183 | 135 | 67·5 | 33·4 | F. | V.F. |
| " .. | 80 | " ... | May 7.... | 168 | 127 | 83·8 | 26·8 | V.S. | V.S. |
| Outside. | 111 | " ... | Jan. 5.... | 192 | 134 | 76·2 | 32·5 | S. | V.S. |
| " .. | 112 | " ... | Mar. 8.... | 182 | 135 | 83·4 | 30·7 | S. | V.S. |
| " .. | 116 | " ... | Feb. 10.... | 181 | 135 | 78·3 | 32·5 | S. | V.S. |
| " .. | 117 | " ... | Mar. 8.... | 195 | 145 | 79·0 | 32·0 | M.F. | V.S. |
| Inside.. | 11 | West... | Dec. 15.... | 185 | 145 | 71·3 | 32·9 | S. ? | M.F. |
| " .. | 12 | " ... | " 15.... | 182 | 135 | 79·6 | 30·6 | V.S. | V.S. |
| " .. | 16 | " ... | Jan. 20.... | 180 | 135 | 76·8 | 31·2 | S. | V.S. |
| " .. | 18 | " ... | Feb. 16.... | 180 | 132 | 82·4 | 33·0 | V.S. | V.S. |
| Outside. | 52 | " ... | Nov. 14.... | 182 | 127 | 72·1 | 31·8 | V.S. | M.F. |
| " .. | 54 | " ... | " 14.... | 176 | 125 | 72·4 | 33·0 | V.S. | M.F. |
| " .. | 57 | " ... | Jan. 5.... | 197 | 136 | 79·9 | 32·0 | S. | V.S. |
| " .. | 60 | " ... | " 13.... | 182 | 145 | 77·6 | 33·5 | F. | V.S. |

## RATION J.

1st Period .............Corn Meal, dry.
2nd " .............Oats, Pease and Barley, in equal parts, dry.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 81 | East ... | Mar. 15.... | 199 | 137 | 77·9 | 31·6 | M. F. | V. S. |
| " .. | 83 | " ... | May 28 ... | 206 | 160 | 76·8 | 28·6 | M. F. | V. S. |
| Outside. | 121 | " ... | Feb. 23.... | 186 | 135 | 80·5 | 31·8 | S. | V. S. |
| " .. | 125 | " ... | " 10.... | 181 | 125 | 81·1 | 30·4 | S. | V. S. |
| Inside.. | 22 | West... | " 16.... | 180 | 125 | 77·3 | 33·8 | S. | V. S. |
| " .. | 24 | " ... | " 23.... | 179 | 125 | 77·5 | 32·0 | S. | V. S. |
| Outside. | 61 | " ... | " 10.... | 180 | 130 | 80·8 | 30·5 | V. S. | V. S. |
| " .. | 64 | " ... | " 10.... | 180 | 126 | 78·8 | 31·7 | S. | V. S. |

## RATION K.

1st Period.............Oats, Pease and Barley, in equal parts, dry.
2nd " .............Corn Meal, dry.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 88 | East ... | Nov. 14 ... | 180 | 132 | 69·7 | 34·4 | M. F. | F. |
| " .. | 90 | " ... | Dec. 15.... | 185 | 140 | 70·9 | 33·4 | M F. | F. |
| Outside. | 126 | " ... | Feb. 23.... | 179 | 125 | 78·9 | 32·5 | F. | V. S. |
| " .. | 127 | " ... | Jan. 13.... | 182 | 135 | 74·6 | 33·8 | M. F. | S. |
| Inside.. | 27 | West... | " 13.... | 183 | 143 | 79·5 | 32·9 | M. F. | V. S. |
| " .. | 28 | " ... | Mar. 15.... | 183 | 140 | 74·9 | 29·9 | F. | S. |
| Outside. | 67 | " ... | Nov. 30.... | 187 | 132 | 71·7 | 27·8 | S. ? | M. F. |
| " .. | 69 | " ... | Dec. 21.... | 182 | 137 | 74·5 | 34·5 | M. F. | S. |

## RATION L.

1st Period............Corn Meal, soaked.
2nd " ............Oats, Pease and Barley, in equal parts, soaked.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 91 | East.... | Mar. 30.... | 179 | 133 | 70·7 | 33·1 | F. | F. |
| " .. | 92 | " ... | " 30... | 187 | 138 | 70·7 | 31·5 | F. | F. |
| Outside. | 131 | " ... | " 8.... | 202 | 134 | 74·1 | 33·9 | F. | S. |
| " . | 135 | " ... | " 8.... | 186 | 116 | 79·0 | 31·3 | S. | V. S. |
| Inside.. | 33 | West... | Dec. 29.... | 190 | 132 | 81·5 | .......... | S. | V. S. |
| " .. | 34 | " ... | Jan. 5.... | 190 | 123 | 79·6 | .......... | S. | V. S. |
| Outside. | 71 | " ... | Feb. 3 ... | 182 | 134 | 78·3 | 32·6 | S. | V. S. |
| " . | 72 | " ... | " 3.... | 194 | 140 | 77·6 | 31·7 | S. | V. S. |

## RATION M.

1st Period............Oats, Pease and Barley, in equal parts, soaked.
2nd " ............Corn Meal, soaked.

| Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|
| Inside.. | 97 | East.... | Dec. 8.... | 196 | 142 | 72·3 | 32·3 | S. | M.F. |
| " .. | 98 | " ... | Jan. 20.... | 190 | 136 | 75·9 | 33·3 | S. | S. |
| Outside. | 136 | " ... | Feb. 3.... | 184 | 140 | 73·3 | 32·0 | M.F. | S. |
| " . | 137 | " ... | " 23.... | 187 | 135 | 79·0 | 31·7 | F. | V. S. |
| Inside.. | 38 | West... | Nov. 30.... | 183 | 128 | 70·4 | 33·0 | S. | F. |
| " .. | 39 | " ... | " 30.... | 180 | 130 | 70·4 | 32·8 | V. S. | F. |
| Outside. | 79 | " ... | Dec. 8. .. | 180 | 132 | 70·5 | 33·4 | S. | F. |
| " . | 80 | " ... | Mar. 15.... | 179 | 135 | 75·5 | 31·4 | F. | S. |

## RATION 'N.' 'O.' 'P.'

'N.'—Half Corn Meal, half Oats, Pease and Barley in equal parts, dry.
'O.'—Grain as in 'N,' plus Mangels.
'P.'—Grain as in 'N,' plus steamed Clover.

| Ration. | Inside or Outside. | No. of Pig. | East or West. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|---|---|
| N | Outside. | 13 | East. | Ap'l. 9... | 197 | 142 | 73·1 | 32·2 | M. F. | S. |
| | " | 31 | " | " 9... | 170 | 123 | 72·7 | 32·0 | M. F. | M. F. |
| | " | 34 | " | " 9... | 173 | 125 | 72·8 | 31·9 | F. | M. F. |
| | " | 6 | " | " 9... | 181 | 132 | 72·9 | 30·0 | F. | M. F. |
| | " | 9 | " | " 30... | 189 | 130 | 74·1 | 31·0 | M. F. | S. |
| | " | 12 | " | " 30... | 180 | 125 | 76·4 | 32·0 | S. | V. S. |
| O. | " | 95 | " | " 9... | 196 | 136 | 72·9 | 31·3 | S. | M. F. |
| | " | 93 | " | " 9... | 186 | 125 | 76·6 | 31·2 | S. | V. S. |
| | " | 94 | " | " 9... | 188 | 126 | 76·9 | 31·0 | S. | V. S. |
| | " | 96 | " | " 9... | 173 | 115 | 73·3 | 31·2 | S. | S. |
| | " | 97 | " | May 28... | 185 | 137 | 73·8 | 32·3 | M. F. | S. |
| | " | 98 | " | " 28... | 161 | 117 | 75·9 | 33·4 | F. | S. |
| P. | " | 33 | " | Ap'l. 9... | 184 | 130 | 75·2 | 33·5 | M. F. | S. |
| | " | 4 | " | " 9... | 183 | 130 | 70·8 | 33·3 | M. F. | F. |
| | " | 100 | " | " 30... | 175 | 115 | 77·6 | 31·4 | M. F. | V. S. |
| | " | 2 | " | May 28... | 191 | 135 | 76·8 | 32·3 | M. F. | V. S. |
| | " | 3 | " | " 28... | 176 | 117 | 78·8 | 31·3 | S. | V. S. |
| | " | 32 | " | " 28... | 185 | 135 | 77·4 | 31·0 | S- | V. S. |

## SERIES 2—RATION 1.

Oats, Pease and Barley, $\frac{1}{3}$ each, 1900.

| No. | Sex. | Date of Slaughtering | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 243 | B | Nov. 8...... | 192 | 134 | 68·2 | 32·0 | V. F. | F. |
| 244 | B | Feb. 13..... | 168 | 122 | 69·6 | 32·2 | V. F. | F. |
| 245 | B | Nov. 30..... | 189 | 137 | 67·6 | 33·0 | V. F. | V. F. |
| 246 | S | Nov. 8.. | 179 | 124 | 71·6 | 30·0 | V. F. | M. F. |
| 247 | S | Dec. 8...... | 180 | 126 | 66·7 | 33·8 | V. F. | V. F. |

## RATION 2.

Corn Meal.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 225 | B. | Dec. 31 ..... | 187 | 144 | 75·8 | 30·6 | F. | V.S. |
| 227 | B. | " 31.... | | 135 | 82·4 | 29·0 | S. | V.S. |
| 228 | S. | Feb. 13 .. | [illegible] | 118 | 87·9 | 27·0 | V.S. | V.S. |
| 232 | B. | Jan. 28.... | | 133 | 82·7 | 29·0 | V.S. | V.S. |
| 233 | B. | Feb. 13...... | 147 | 110 | 87·8 | 27·8 | V.S. | V.S. |
| 236 | B. | " 13.... | 158 | 116 | 84·9 | 27·9 | V.S. | V.S. |

## RATION 3.

Corn Meal and Skim Milk.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 237 | S. | Oct. 29 ... | 198 | 140 | 69·9 | 34·0 | F. | F. |
| 238 | S. | " 29...... | 184 | 130 | 73·6 | 30·5 | S. | S. |
| 239 | S. | " 29...... | 190 | 135 | 69·8 | 35·3 | M.F. | F. |
| 240 | S. | " 29...... | 187 | 131 | 70·6 | 34·6 | S. | F. |
| 241 | S. | " 29...... | 208 | 150 | 69·7 | 34·0 | V.F. | F. |
| 242 | S. | " 29...... | 185 | 132 | 72·1 | 31·3 | M.F. | M.F. |

## RATION 4.

Pease.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 207 | B. | Nov. 23.... | 185 | 122 | 69·6 | 30·1 | V.F. | F. |
| 208 | B. | Sept. 27.... | 206 | 145 | 81·7 | 29·7 | S. | V.S. |
| 209 | S. | " 27.... | 198 | 128 | 73·2 | 31·0 | S. | S. |
| 210 | B. | Nov. 23.... | 191 | 135 | 67·4 | 31·0 | V.F. | V.F. |
| 211 | B. | Oct. 29.... | 220 | 155 | 62·2 | 35·9 | V.F. | V.F. |
| 212 | S. | " 29.... | 201 | 145 | 63·4 | 36·5 | V.F. | V.F. |

## RATION 5.

Beans.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 201 | S. | Sept. 27.... | 193 | 127 | 83·2 | 30·0 | S. | V.S. |
| 202 | B. | " 27.... | 183 | 123 | 89·9 | 28·5 | V.S. | V.S. |
| 203 | B. | Oct. 29.... | 186 | 121 | 80·8 | 29·0 | V.S. | V.S. |
| 204 | B. | Dec. 8.... | 188 | 121 | 84·6 | 30·7 | S. | V.S. |
| 205 | S. | Feb. 13.... | 146 | 99 | 85·4 | 28·8 | V.S. | V.S. |
| 206 | S. | Dec. 31.... | 180 | 121 | 85·9 | 30·0 | V.S. | V.S. |

## RATION 6.

$\frac{1}{2}$ Corn Meal; $\frac{1}{2}$ Oats, Pease and Barley, $\frac{1}{3}$ each.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 217 | S. | Nov. 8.... | 186 | 133 | 75·2 | 29·8 | S. | V. S. |
| 219 | B. | " 23.... | 190 | 115 | 74·2 | 30·8 | V. F. | S. |
| 220 | S. | " 8.... | 179 | 125 | 75·2 | 30·5 | S. | V. S. |
| 221 | S. | " 23.... | 193 | 138 | 74·8 | 29·1 | F. | S. |
| 223 | B. | " 30.... | 183 | 134 | 76·8 | 30·6 | M. F. | V. S. |
| 309 | S. | " 8.... | 205 | 146 | 71·4 | 31·2 | S. | M. F. |

## RATION 7.

½ Corn Meal, ½ Oats, Pease and Barley + skim milk.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 286 | S. | Nov. 23.... | 201 | 141 | 71·8 | 31·1 | F. | M. F. |
| 289 | B. | " 30.... | 199 | 137 | 76·9 | 30·2 ? | M. F. | V. S. |
| 291 | B. | " 30.... | 184 | 131 | 75·1 | 31·3 ? | M. F. | V. S. |
| 294 | B. | Dec. 31.... | 203 | 154 | 69·0 | 31·4 | V. F. | F. |
| 297 | B. | " 31.... | 205 | 155 | 71·3 | 31·3 | V. F. | M. F. |
| 308 | S. | Nov. 23.... | 180 | 136 | 69·5 | 31·1 | V. F. | F. |

## RATION 8.

1st Period.................. ½ Corn Meal ; ½ Oats, Pease and Barley.

2nd " ..................Corn Meal.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 214 | B. | Dec. 6.... | 205 | 143 | 77·5 | 31·1 | S. | V.S. |
| 215 | B. | " 31.... | 178 | 130 | 82·6 | 29·8 | M.F. | V.S. |
| 216 | S. | " 31.... | 194 | 144 | 76·6 | 31·1 | V.F. | V.S. |
| 218 | B. | " 6.... | 210 | 152 | 75·0 | 31·0 | F. | S. |
| 222 | B. | " 6.... | 190 | 139 | 78·7 | 31·1 | S. | V.S. |
| 224 | S. | " 31.... | 195 | 145 | 77·2 | 30·4 | F. | V.S. |

## RATION 9.

1st Period..................Oats, Peas and Barley, + skim-milk.

2nd " ..................Corn Meal, commencing Oct. 17, 1900.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 250 | B. | Jan. 28.... | 176 | 125 | 75·8 | 30·7 | F. | V.S. |
| 251 | S. | " 28.... | 185 | 133 | 74·3 | 31·0 | F. | S. |
| 252 | S. | " 14.... | 187 | 137 | 73·3 | 30·9 | S. | S. |
| 253 | B. | Nov. 30.... | 181 | 135 | 71·7 | 32·2 | V.F. | M.F. |
| 254 | S. | Jan. 14.... | 187 | 140 | 74·8 | 30·7 | S. | S. |

## RATION 10.

½ Corn Meal ; ½ Oats, Pease and Barley ; pastured first on Rape, finally on Artichokes.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 279 | S. | Dec. 6.... | 175 | 126 | 78·3 | ? | F. | V. S. |
| 280 | S. | " 6.... | 195 | 138 | 65·4 | ? | F. | V. F. |
| 281 | S. | " 6 ... | 201 | 141 | 76·6 | ? | F. | V. S. |
| 282 | S. | " 6.... | 171 | 127 | 74·9 | ? | V. F. | S. |
| 283 | B. | " 6.... | 203 | 150 | 75·8 | ? | F. | V. S. |
| 284 | S. | " 6.... | 182 | 131 | 78·5 | 31·4 | F. | V. S. |

## RATION 11.

1st Period—Pastured on Rape ; ½ Corn Meal, ½ Oats, Pease and Barley.

2nd " Oct. 3—Same grain ration and Raw Pumpkins.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 261 | B. | Nov. 30..... | 181 | 135 | 73·2 | 29·3 | V F. | S. |
| 262 | B. | Dec. 8...... | 174 | 122 | 75·2 | 32·5 | V.F. | V.S. |
| 265 | B. | " 30..... | 180 | 130 | 77·8 | 31·4 | F. | V.S. |
| 266 | S. | " 30...... | 180 | 132 | 75·2 | 30·9 | F. | V.S. |
| 272 | S. | " 8..... | 191 | 142 | 69·9 | 33·5 | V.F. | F. |
| 305 | S. | " 8...... | 175 | 127 | 73·7 | 32·0 ? | V.F. | S. |

## RATION 12.

1st Period............Corn Meal.

2nd " ............Oats, Pease and Barley and cooked Pumpkins.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 292 | S. | Dec. 6 .... | 185 | 139 | 78·1 | 30·8 | F. | V. S. |
| 293 | B. | Nov. 30 .... | 190 | 142 | 70·8 | 31·2 | V. F. | F. |
| 299 | B. | " 8 ... | 181 | 135 | 72·3 | 31·5 | F. | M. F. |
| 300 | B. | " 30 .... | 190 | 140 | 73·2 | 30·9 | V. F. | S. |
| 306 | B. | " 8 .... | 198 | 139 | 69·5 | 32·4 | M. F. | F. |
| 307 | S. | Dec. 6 .... | 182 | 137 | 75·6 | 31·8 | V. F. | V. S. |

## RATION 13.

1st Period................½ Corn Meal ; ½ Oats, Pease and Barley.

2nd " ................½ Corn Meal ; ½ Pease.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 287 | S. | Dec. 8.... | 186 | 134 | 80·4 | 30·1 | F. | V. S. |
| 290 | S. | Nov. 30.... | 190 | 139 | 73·7 | 31·1 | F. | S. |
| 298 | S. | Dec. 31.... | 182 | 135 | 69·0 | 31·3 | V. F. | F. |
| 303 | B. | Nov. 8 ... | 180 | 124 | 68·5 | 31·8 | F. | F. |
| 310 | S. | Dec. 31.... | 197 | 143 | 69·9 | 31·5 | V. F. | F. |

## RATION 14.

½ Corn Meal ; ½ Oats, Pease and Barley and Artichokes.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 263 | S. | Dec. 6.... | 191 | 137 | 75·9 | 31·0 | F. | V. S. |
| 264 | S. | " 6 ... | 201 | 147 | 70·9 | 31·1 | V. F. | F. |
| 267 | B. | " 6.... | 182 | 137 | 73·2 | 31·3 | V. F. | S. |
| 269 | S. | " 6.... | 191 | 140 | 75·1 | 31·8 | V. F. | V. S. |
| 271 | B. | " 6.... | 182 | 131 | 72·0 | 32·2 | V. F. | M. F. |

## RATION 15.

1st Period............Pastured on Clover.

2nd " ............From Oct. 30, fed Clover—½ Corn Meal, ½ Oats, Pease and Barley.

| No. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|
| 273......... ... | Nov. 23.... | 182 | 130 | 80·3 | 30·7 | V. F. | V. S. |
| 275... ......... | " 23.... | 179 | 120 | 83·4 | 28·8 | S. | V. S. |
| 276......... .... | " 23.. . | 182 | 129 | 79·5 | 29·2 | F. | V. S. |
| 277............. | " 23.... | 192 | 137 | 72·6 | 30·2 | F. | M. F. |
| 278............. | " 23.... | 238 | 170 | 71·2 | 31·3 | V. F. | M. F. |
| 310............. | Dec. 31.... | 197 | 143 | 69·9 | 31·5 | V. F. | F. |

## RATION 16.

1st Period.............................. Corn Meal.

2nd " ..............................Oats, Pease and Barley.

| No. | Sex. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| 226 | S. | Dec. 31.... | 180 | 134 | 78·9 | .......... | S. | V. S. |
| 229 | S. | " 31.... | 189 | 135 | 75·5 | 31·0 | F. | V. S. |
| 230 | S. | Jan. 14.... | 193 | 136 | 74·9 | 30·9 | S. | S. |
| 231 | B. | Dec. 31.... | 186 | 135 | 73·3 | 31·6 | V. F. | S. |
| 234 | S. | " 31.... | 180 | 135 | 78·7 | 30·7 | M. F. | V. S. |
| 235 | S. | Jan. 14.... | 194 | 140 | 75·2 | 30·6 | S. | V. S. |

## RATION 17.

A—½ Corn Meal, ½ Oats, Pease, Barley and Skim-milk + Turnips.

B— " " " " Mangels.

C— " " " " Sugar Beet.

| — | Number of Pig. | Date of Slaughtering. | Live Weight. | Dressed Weight. | Olein. | Melting Point. | Inspection Rating. | Rating by Olein. |
|---|---|---|---|---|---|---|---|---|
| A.. | 312 | May 3.. ..... | 197 | 133 | 71·8 | 32·0 | V.F. | M.F. |
| | 313 | " 3........ | 197 | 135 | 70·2 | 32·5 | V.F. | F. |
| | 314 | " 3........ | 189 | 126 | 69·6 | 32·0 | F. | F. |
| | 315 | " 3........ | 185 | 121 | 70·1 | 32·7 | V.F. | F. |
| B.. | 316 | " 3........ | 195 | 135 | 65·9 | 33·0 | V.F. | V.F. |
| | 317 | " 3........ | 195 | 138 | 68·0 | 32·3 | V.F. | V.F. |
| | 318 | " 3........ | 182 | 125 | 69·1 | 32·7 | F. | F. |
| | 319 | " 3........ | 194 | 131 | 69·6 | 32·9 | V.F. | F. |
| C.. | 320 | " 3....... | 175 | 118 | 66·0 | 32·5 | F. | V.F. |
| | 321 | " 3........ | 218 | 155 | 66·1 | 32·5 | V.F. | V.F. |
| | 322 | " 3........ | 187 | 130 | 69·1 | 31·9 | F. | F. |
| | 323 | " 3....... | 227 | 157 | 66·3 | 32·2 | V.F. | V.F. |

DEPARTMENT OF AGRICULTURE

# CENTRAL EXPERIMENTAL FARM
## OTTAWA, CANADA

# RESULTS OBTAINED IN 1901

FROM

# Trial Plots of Grain, Fodder Corn, Field Roots and Potatoes

By Wm. SAUNDERS, LL.D.,
*Director Experimental Farms.*

## BULLETIN No. 39

DECEMBER, 1901

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE.

# TABLE OF CONTENTS.

To the Honourable

The Minister of Agriculture.

SIR,—I herewith submit for your approval Bulletin No. 39 of the Experimental Farm series, which has been prepared by myself. There are presented in this publication the results of a large number of experiments, which have been conducted at all the experimental farms under your Department during the season of 1901, with oats, barley, spring wheat, pease, Indian corn, turnips, mangels, carrots, sugar beets and potatoes in plots of uniform size, and the crops grown under uniform conditions. The average results also are given of six and seven years' tests on such plots with varieties of oats, barley and spring wheat, four to seven years with plots of pease, five to seven years with plots of Indian corn and potatoes, five and six years with plots of turnips, mangels and carrots, and four to five years' experience with sugar beets.

These trial plots are conducted with the object of gaining information as to the relative productiveness of the different sorts and their earliness in ripening. The returns show much variation in the weight of the crops grown and point to the importance of care in the choice of varieties of seed for sowing. It is hoped that these results giving the experience gained under some of the most important climatic variations found in the country will prove useful to farmers in every part of Canada.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,

*Director Experimental Farms.*

OTTAWA, December 20, 1901.

# RESULTS OBTAINED IN 1901

FROM TRIAL PLOTS OF

# GRAIN, FODDER CORN, FIELD ROOTS AND POTATOES.

By William Saunders, LL.D., F.R.S.C., F.L.S., &c.

*Director Experimental Farms.*

Seven years ago a number of experiments were undertaken at each of the Dominion Experimental Farms with the object of gaining information as to the best, most productive and earliest ripening varieties of grain, fodder corn, field roots and potatoes. In arranging for these uniform trial plots the same varieties were sown at each of the farms, the seed being supplied from a common stock. The seed in each case has been sown early and as a rule all the varieties of the same product have been sown on the same day or at the most within two or three days, so as to give to all in this respect an even start. The land chosen each year for these plots has been as nearly uniform in character as could be found, and before sowing has been brought into a good condition of tilth. In this bulletin, which is the seventh of the series, the particulars are arranged after the same plan as in previous issues, the different varieties being placed in the tables which follow the order of their productiveness at the Central Experimental Farm. The number of days required for each sort, from sowing to ripening, is also given and thus their relative earliness is shown.

In comparing the results obtained from the several varieties in any one year with another, the relative positions occupied by the different sorts will often vary from lack of uniformity in the soil and other causes. When, however, the average of a series of results can be given covering a number of years, the evidence is much more satisfactory and valuable.

In the summary given near the end of this bulletin the average crops obtained from the sowings of seven successive years are shown. On comparing the crops of the past year with the average of the previous five and six years, it will be seen that the results of the harvest of 1901 have on the whole been very satisfactory. The best twelve yielding oats on the Central Farm, owing to unfavourable conditions of

weather, average nearly nine bushels less per acre than the average of past years. At the Experimental Farm at Nappan the yield for 1901 is about one and a half bushels less. At Brandon the yield has been considerably above the average, while at Indian Head the crop has been a phenomenal one. The average given at this farm by the best twelve sorts for the five years previous was 83 bushels 13 lbs. per acre, the record for 1901 is an average of 132 bushels 27 lbs., or more than 49 bushels over the previous average. At Agassiz, B.C., the crop has also been unusually large, having exceeded the average of the previous six years by over 36 bushels. In barley the crops at Ottawa, Nappan and Brandon have been above the average and largely so at Indian Head and Agassiz. In spring wheat the average has been exceeded at all the farms and has been very much above the average at Indian Head and Agassiz. Pease show a falling off at Ottawa and Brandon and increases at Nappan, Indian Head and Agassiz. Indian corn is well above the average throughout, except at Agassiz, where it falls below. The yield of turnips, mangels, carrots and sugar beets are good and all considerably above the average, excepting at Agassiz, where the yield of mangels, carrots and sugar beets fall below the usual return.

In potatoes there has been a considerable increase in the crops at Ottawa and Nappan, and remarkable increases at Brandon, Indian Head and Agassiz.

By the issue of this publication early in the season the farmers of Canada are advised as to the relative productiveness and earliness of each sort at the several experimental farms before making their selection of seed for sowing during the approaching season.

## TRIAL PLOTS OF OATS.

In arranging the uniform trial plots of oats from year to year the number of varieties under test have been reduced during the past two or three years by omitting those which during a period of five years have not at any time found their way into the list of the twelve most productive sorts at any of the experimental farms. The names of the varieties discontinued either on this account or from weakness of straw or other defects, are the following eighteen sorts :—Coulommiers, Doncaster Prize, Early Dawson, Early Etampes, Giant Cluster, Imported Irish, Medal, Mortgage Lifter, Poland, Prize Cluster, Rennie's Prize White, Scottish Chief, Scotch Hopetown, Victoria Prize, Welcome, White Wonder, White Monarch, Winter Grey.

Some additions of new kinds have been made to the list, among them four of the new varieties of oats recently introduced into cultivation by the Garton Bros. Seed Co., of Newton-le-Willows, England, namely, Waverley, Tartar King, Goldfinder and Pioneer. Among other recent additions to the list are Loughoughton, Salzer's Big Four, Scotch Potato and Sensation. The Garton Bros.' oats have not given as good crops as was looked for, but they are very promising and it is expected they will do better after a year or two when they become more acclimatized.

There are included in the sixty-four varieties under trial during 1901 the following cross-bred oats which have been originated at the experimental farms :—Cromwell, Holland, Olive, Oxford, Pense, Miller, Brandon, Milford, King, Kendal, Master and Russell. At the farms at Ottawa, Ont., Nappan, N.S., and Agassiz, B.C., the size

of the plots on which these oats were sown was one-fortieth of an acre each, and at Brandon, Man., and Indian Head, N.W.T., they were one-twentieth of an acre. The quantity of seed sown of each sort was in the proportion of two bushels per acre, and the dates of sowing were as follows :—At Ottawa most of them were sown on April 17, a few were sown later ; Nappan, May 1 ; Brandon, May 10 to 13 ; Indian Head, May 9 ; and at Agassiz, April 18.

Particulars as to the character of the land in each case, and of the preparation and treatment it has had, will be found in the Annual Report of the Experimental Farms for the year 1901.

UNIFORM TEST PLOTS OF OATS.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, Season of 1899. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N. S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Cromwell | 58 | 8 | 74 | 4 | 65 | 10 | 102 | 12 | 68 | 8 | 73 | 22 | 100 | 107 | 101 | 105 | 120 | 106 3/5 |
| 2 | Joanette | 57 | 2 | 62 | 12 | 68 | 28 | 114 | 24 | 67 | 2 | 74 | .. | 103 | 101 | 110 | 107 | 118 | 107 4/5 |
| 3 | Columbus | 57 | 2 | 55 | 10 | 84 | 4 | 120 | .. | 65 | 30 | 76 | 16 | 101 | 109 | 99 | 104 | 120 | 106 3/5 |
| 4 | Milford | 57 | 2 | 60 | .. | 31 | 6 | 102 | 32 | 72 | 12 | 64 | 24 | 96 | 107 | 99 | 106 | 120 | 105 3/5 |
| 5 | Kendal | 55 | 30 | 61 | 6 | 70 | 20 | 108 | 28 | 66 | 6 | 72 | 18 | 100 | 107 | 110 | 108 | 120 | 109 |
| 6 | Early Maine | 55 | 10 | 62 | 12 | 91 | 26 | 124 | 4 | 66 | 16 | 80 | .. | 100 | 108 | 102 | 99 | 118 | 105 2/5 |
| 7 | American Triumph | 54 | 24 | 58 | 28 | 87 | 2 | 119 | 14 | 86 | 26 | 83 | 12 | 100 | 113 | 101 | 99 | 125 | 107 3/5 |
| 8 | Olive | 54 | 24 | 58 | 28 | 70 | .. | 111 | 26 | 85 | 10 | 76 | 4 | 96 | 107 | 109 | 105 | 120 | 107 2/5 |
| 9 | Improved American | 54 | 24 | 65 | 30 | 90 | .. | 135 | 30 | 70 | 20 | 83 | 14 | 100 | 109 | 102 | 101 | 120 | 106 2/5 |
| 10 | Lincoln | 54 | 24 | 64 | 24 | 85 | 30 | 130 | 20 | 94 | 24 | 86 | 4 | 100 | 109 | 101 | 99 | 120 | 105 4/5 |
| 11 | Mennonite | 54 | 24 | 63 | 18 | 80 | .. | 134 | 4 | 68 | 8 | 80 | 4 | 98 | 109 | 101 | 102 | 118 | 105 3/5 |
| 12 | Black Beauty | 53 | 18 | 65 | 30 | 57 | 22 | 109 | 14 | 101 | 6 | 77 | 18 | 95 | 100 | 108 | 102 | 124 | 105 4/5 |
| 13 | Oxford | 51 | 26 | 51 | 26 | 65 | 30 | 80 | .. | 80 | .. | 65 | 30 | 100 | 109 | 102 | 104 | 120 | 107 |
| 14 | Abundance | 51 | 6 | 62 | 12 | 83 | 18 | 147 | 2 | 80 | .. | 84 | 28 | 100 | 107 | 102 | 101 | 120 | 106 |
| 15 | Pense | 50 | .. | 64 | 24 | 59 | 14 | 107 | 22 | 74 | 4 | 71 | 6 | 96 | 107 | 110 | 106 | 118 | 107 2/5 |
| 16 | California Prolific [illegible] | 50 | .. | 58 | 28 | 69 | 14 | 112 | 32 | 81 | 26 | 74 | 20 | 103 | 109 | 110 | 103 | 123 | 109 3/5 |
| 17 | Banner | 48 | 28 | 63 | 18 | 85 | 10 | 129 | 14 | 77 | 12 | 80 | 30 | 100 | 107 | 103 | 104 | 118 | 106 2/5 |
| 18 | Holstein Prolific | 48 | 28 | 57 | 22 | 81 | 26 | 118 | 8 | 94 | 4 | 80 | 4 | 100 | 106 | 102 | 99 | 124 | 106 1/5 |
| 19 | Prolific Blk. Tartarian | 48 | 28 | 63 | 18 | 60 | 20 | 114 | 24 | 77 | 2 | 72 | 32 | 103 | 109 | 107 | 105 | 118 | 108 2/5 |
| 20 | American Beauty | 48 | 8 | 68 | 8 | 79 | 14 | 137 | 2 | 72 | 22 | 81 | 4 | 98 | 109 | 99 | 102 | 120 | 105 3/5 |
| 21 | Irish Victor | 48 | 8 | 57 | 22 | 84 | 24 | 87 | 2 | * | | 69 | 14 | 100 | 106 | 99 | 105 | .... | 102 1/2 |
| 22 | Sensation | 47 | 22 | 58 | 28 | 75 | 10 | 97 | 22 | 63 | 18 | 68 | 20 | 100 | 102 | 102 | 103 | 118 | 105 |
| 23 | Thousand Dollar | 47 | 22 | 60 | .. | 68 | 8 | 138 | 28 | 71 | 6 | 77 | 6 | 98 | 107 | 102 | 101 | 120 | 105 3/5 |
| 24 | Russell | 47 | 22 | 47 | 2 | 71 | 6 | 95 | 10 | 88 | 8 | 69 | 30 | 100 | 107 | 104 | 102 | 124 | 107 2/5 |
| 25 | Cream Egyptian | 47 | 22 | 76 | 16 | 72 | 12 | 96 | 16 | 91 | 6 | 76 | 28 | 100 | 107 | 90 | 94 | 124 | 103 |
| 26 | Rosedale | 47 | 2 | 71 | 26 | 76 | 16 | 114 | 26 | 67 | 32 | 75 | .. | 103 | 101 | 104 | 103 | 120 | 106 1/5 |
| 27 | Salzer's Big Four | 47 | 2 | 56 | 16 | 60 | 20 | † | | 91 | 26 | 63 | 33 | 98 | 105 | 91 | † | 125 | 104 3/4 |
| 28 | White Schonen | 46 | 16 | 68 | 8 | 87 | 2 | 97 | 2 | 93 | 18 | 78 | 16 | 100 | 106 | 101 | 97 | 120 | 104 4/5 |
| 29 | Master | 46 | 16 | 47 | 2 | 66 | 16 | 90 | 20 | 87 | 22 | 67 | 22 | 103 | 109 | 102 | 106 | 126 | 109 1/5 |
| 30 | Hazlett's Seizure | 46 | 16 | 63 | 18 | 81 | 6 | 101 | 26 | 91 | 26 | 76 | 32 | 100 | 101 | 93 | 95 | 124 | 102 3/5 |
| 31 | Buckbee's Illinois | 45 | 10 | 62 | 12 | 73 | 18 | 115 | 30 | 95 | 10 | 78 | 16 | 100 | 109 | 106 | 100 | 124 | 107 4/5 |
| 32 | Golden Beauty | 45 | 10 | 60 | .. | 88 | 28 | 126 | 16 | 77 | 22 | 79 | 20 | 100 | 109 | 104 | 101 | 125 | 107 4/5 |
| 33 | Oderbruch | 44 | 4 | 68 | 8 | 71 | 26 | 119 | 14 | 86 | 16 | 78 | .. | 103 | 107 | 104 | 102 | 120 | 107 1/5 |
| 34 | Improved Ligowo | 44 | 4 | 60 | .. | 81 | 6 | 125 | 30 | 78 | 18 | 77 | 32 | 98 | 106 | 99 | 98 | 124 | 105 |
| 35 | Danish Island | 44 | 4 | 57 | 22 | 89 | 14 | 128 | 8 | 91 | 6 | 82 | 4 | 101 | 109 | 101 | 100 | 126 | 107 2/5 |
| 36 | White Giant | 44 | 4 | 63 | 18 | 89 | 14 | 91 | 26 | 82 | 12 | 74 | 8 | 101 | 107 | 103 | 98 | 120 | 105 4/5 |

* Not sown at Agassiz.

† Not sown at Indian Head.

## UNIFORM TEST PLOTS OF OATS—*Concluded.*

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, Season of 1899. Ottawa. Bush. | Ottawa. Lbs. | Nappan, N.S. Bush. | Nappan, N.S. Lbs. | Brandon, Man. Bush. | Brandon, Man. Lbs. | Agassiz, B.C. Bush. | Agassiz, B.C. Lbs. | Indian Head, N.W.T. Bush. | Indian Head, N.W.T. Lbs. | Average of all Farms. Bush. | Average of all Farms. Lbs. | Number of Days from Sowing to Harvesting. Ottawa, Ont. Days. | Nappan, N.S. Days. | Brandon, Man. Days. | Indian Head, N.W.T. Days. | Agassiz, B.C. Days. | Average of all Farms. Days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | Newmarket | 44 | 4 | 63 | 18 | 68 | 8 | 124 | 24 | 62 | 12 | 72 | 20 | 100 | 109 | 102 | 100 | 120 | 106 1/5 |
| 38 | Early Gothland | 44 | 4 | 58 | 28 | 75 | 10 | 119 | 14 | 89 | 4 | 77 | 12 | 101 | 107 | 104 | 102 | 120 | 106 4/5 |
| 39 | King | 43 | 28 | 54 | 4 | 65 | 30 | 110 | .. | 90 | .. | 72 | 26 | 100 | 107 | 105 | 98 | 125 | 107 |
| 40 | New Zealand | 42 | 12 | 49 | 14 | 78 | 8 | 105 | 10 | 78 | 8 | 70 | 24 | 113 | 113 | 105 | 108 | 120 | 111 4/5 |
| 41 | Wide Awake | 41 | 26 | 56 | 16 | 89 | 14 | 129 | 14 | 100 | .. | 83 | 14 | 100 | 109 | 103 | 99 | 123 | 106 4/5 |
| 42 | Holland | 41 | 26 | 47 | 2 | 67 | 22 | 105 | 10 | 97 | 2 | 71 | 26 | 103 | 109 | 110 | 104 | 124 | 110 |
| 43 | Pioneer | 41 | 26 | 57 | 22 | 61 | 26 | 104 | 24 | 75 | . | 68 | 6 | 100 | 109 | 101 | 106 | 118 | 106 4/5 |
| 44 | Early Blossom | 41 | 26 | 62 | 12 | 74 | 24 | 121 | 26 | 87 | 2 | 77 | 18 | 103 | 107 | 104 | 104 | 118 | 107 1/5 |
| 45 | Bavarian | 40 | 20 | 65 | 30 | 84 | 4 | 117 | 22 | 71 | 26 | 76 | .. | 100 | 109 | 101 | 100 | 118 | 105 3/5 |
| 46 | Abyssinia | 40 | 20 | 68 | 8 | 70 | 20 | 119 | 14 | 89 | 4 | 77 | 20 | 103 | 108 | 102 | 103 | 125 | 108 1/5 |
| 47 | Wallis | 40 | 20 | 61 | 6 | 86 | 16 | 121 | 6 | 68 | 28 | 75 | 22 | 98 | 109 | 103 | 103 | 118 | 106 1/5 |
| 48 | Salines | 40 | 20 | 44 | 24 | 63 | 18 | 96 | 16 | 92 | 32 | 67 | 22 | 104 | 108 | 105 | 105 | 120 | 108 3/5 |
| 49 | Flying Scotchman | 40 | .. | 67 | 2 | 57 | 22 | 103 | 18 | 70 | .. | 67 | 22 | 97 | 101 | 99 | 95 | 118 | 102 |
| 50 | Goldfinder | 39 | 14 | 55 | 10 | 73 | 18 | 116 | 16 | 73 | 8 | 71 | 20 | 103 | 109 | 110 | 109 | 124 | 111 |
| 51 | Miller | 39 | 14 | 56 | 16 | 70 | .. | 95 | 10 | 67 | 32 | 65 | 28 | 106 | 109 | 104 | 98 | 120 | 107 2/5 |
| 52 | Black Mesdag | 37 | 22 | 65 | 30 | 64 | 24 | 87 | 2 | 72 | 12 | 65 | 18 | 95 | 97 | 94 | 96 | 112 | 98 4/5 |
| 53 | Brandon | 37 | 2 | 48 | 8 | 62 | 12 | 92 | 32 | 89 | 14 | 66 | .. | 103 | 109 | 103 | 98 | 120 | 106 2/5 |
| 54 | White Russian | 37 | 2 | 62 | 12 | 69 | 14 | 113 | 18 | 85 | 30 | 73 | 22 | 100 | 105 | 101 | 102 | 120 | 105 3/5 |
| 55 | Siberian | 34 | 24 | 65 | 30 | 88 | 28 | 120 | .. | 74 | 4 | 76 | 24 | 103 | 109 | 101 | 104 | 124 | 108 1/5 |
| 56 | Bonanza | 33 | 18 | 61 | 6 | 69 | 14 | 72 | 32 | 77 | 22 | 62 | 32 | 97 | 101 | 89 | 95 | 125 | 101 2/5 |
| 57 | Golden Giant | 32 | 12 | 57 | 22 | 70 | .. | 108 | 28 | 72 | 32 | 68 | 12 | 103 | 113 | 106 | 106 | 120 | 109 3/5 |
| 58 | Early Archangel | 32 | 12 | 60 | .. | 73 | 18 | 111 | 26 | 81 | 6 | 71 | 26 | 98 | 99 | 101 | 96 | 125 | 103 4/5 |
| 59 | Early Golden Prolific | 32 | 12 | 67 | 2 | 67 | 2 | 127 | 2 | 93 | 8 | 77 | 12 | 100 | 101 | 104 | 98 | 123 | 105 1/5 |
| 60 | Tartar King | 31 | 6 | 60 | .. | 58 | 28 | 98 | 28 | 80 | 20 | 65 | 30 | 98 | 101 | 101 | 105 | 124 | 105 4/5 |
| 61 | Golden Tartarian | 31 | 6 | 60 | .. | 82 | 32 | 99 | 14 | 103 | 18 | 75 | 14 | 106 | 113 | 106 | 103 | 124 | 110 2/5 |
| 62 | Waverley | 30 | .. | 51 | 26 | 78 | 8 | 97 | 2 | 68 | 18 | 65 | 4 | 100 | 107 | 104 | 104 | 118 | 106 3/5 |
| 63 | Longhoughton | 20 | 20 | 44 | 24 | * | .. | 81 | 6 | 69 | 14 | 53 | 33 | 103 | 109 | .... | 109 | 124 | 111 1/4 |
| 64 | Scotch Potato | 20 | 20 | 58 | 28 | 45 | 10 | 94 | 24 | 78 | 28 | 59 | 22 | 103 | 107 | 105 | 106 | 124 | 109 |

* Destroyed by cut-worms.

The twelve varieties of oats which have produced the largest crops during 1901 at the several experimental farms are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Cromwell | 58 | 8 | 7. American Triumph | 54 | 24 |
| 2. Joanette | 57 | 2 | 8. Olive | 54 | 24 |
| 3. Columbus | 57 | 2 | 9. Improved American | 54 | 24 |
| 4. Milford | 57 | 2 | 10. Lincoln | 54 | 24 |
| 5. Kendal | 55 | 30 | 11. Mennonite | 54 | 24 |
| 6. Early Maine | 55 | 10 | 12. Black Beauty | 53 | 18 |

An average crop of 55 bushels 22 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Cream Egyptian | 76 | 16 | 7. White Schonen | 68 | 8 |
| 2. Cromwell | 74 | 4 | 8. Early Golden Prolific | 67 | 2 |
| 3. Rosedale | 71 | 26 | 9. Flying Scotchman | 67 | 2 |
| 4. Abyssinia | 68 | 8 | 10. Bavarian | 65 | 30 |
| 5. American Beauty | 68 | 8 | 11. Improved American | 65 | 30 |
| 6. Oderbruch | 68 | 8 | 12. Black Mesdag | 65 | 30 |

An average crop of 68 bushels 31 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Maine | 91 | 26 | 7. Siberian | 88 | 28 |
| 2. Improved American | 90 | .. | 8. American Triumph | 87 | 2 |
| 3. White Giant | 89 | 14 | 9. White Schonen | 87 | 2 |
| 4. Danish Island | 89 | 14 | 10. Wallis | 86 | 16 |
| 5. Wide Awake | 89 | 14 | 11. Lincoln | 85 | 30 |
| 6. Golden Beauty | 88 | 28 | 12. Banner | 85 | 10 |

An average crop of 88 bushels 10 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Abundance | 147 | 2 | 7. Banner | 129 | 14 |
| 2. Thousand Dollar | 138 | 28 | 8. American Triumph | 129 | 14 |
| 3. American Beauty | 137 | 2 | 9. Wide Awake | 129 | 14 |
| 4 Improved American | 135 | 30 | 10. Danish Island | 128 | 8 |
| 5. Mennonite | 134 | 4 | 11. Early Golden Prolific | 127 | 2 |
| 6. Lincoln | 130 | 20 | 12. Golden Beauty | 126 | 16 |

An average crop of 132 bushels 27 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Tartarian | 103 | 18 | 7. White Schonen | 93 | 18 |
| 2. Black Beauty | 101 | 6 | 8. Early Golden Prolific | 93 | 8 |
| 3. Wide Awake | 100 | .. | 9. Salines | 92 | 32 |
| 4. Holland | 97 | 2 | 10. Hazlett's Seizure | 91 | 26 |
| 5. Buckbee's Illinois | 95 | 10 | 11. Salzer's Big Four | 91 | 26 |
| 6. Lincoln | 94 | 24 | 12. Cream Egyptian | 91 | 6 |

An average crop of 95 bushels 17 lbs. per acre.

The twelve varieties of oats which have produced the largest crops in 1901, taking the average results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Lincoln | 86 | 4 | 7. American Beauty | 81 | 4 |
| 2. Abundance | 84 | 28 | 8. Banner | 80 | 30 |
| 3. Improved American | 83 | 14 | 9. Holstein Prolific | 80 | 4 |
| 4. Wide Awake | 83 | 14 | 10. Mennonite | 80 | .. |
| 5. American Triumph | 83 | 1[illegible] | 11. Early Maine | 80 | .. |
| 6. Danish Island | 82 | 4 | 12. Golden Beauty | 79 | 20 |

An average crop of 82 bushels 3 lbs. per acre.

The average crop of all the varieties of oats tested at each of the experimental farms in 1901 was as follows :—At Ottawa, 44 bushels 12 lbs. per acre ; Nappan, 60 bushels 7 lbs.; Brandon, 72 bushels 8 lbs.; Indian Head, 109 bushels 8 lbs.; and at Agassiz, 80 bushels 15 lbs. The average return given by the whole of the varieties of oats tested at all the farms was 73 bushels 10 lbs. per acre.

## TRIAL PLOTS OF BARLEY.

During the season of 1901 fifty-one varieties of barley have been under test, twenty-one of which were two-rowed sorts and thirty six-rowed. Among the two-rowed sorts there were twelve hybrid varieties which have been produced at the experimental farms : Beaver, Bolton, Clifford, Dunham, Fulton, Harvey, Jarvis, Leslie, Logan, Nepean, Sidney and Victor. Among the six-rowed sorts there are seventeen of these hybrids, namely, Albert, Argyle, Brome, Claude, Empire, Garfield, Mansfield, Nugent, Phœnix, Pioneer, Stella, Success, Summit, Surprise, Trooper, Vanguard and Yale.

The barley plots were the same size as those sown with oats. Two bushels of seed was used in each case, and the dates of sowing were as follows :—At Ottawa, six-rowed, April 19 ; two-rowed, April 26 ; Nappan all May 11 ; Brandon May 17 and 18 ; Indian Head, May 14, and at Agassiz on April 17.

### UNIFORM TEST PLOTS OF TWO-ROWED BARLEY.

| Number. | Name of Variety. | Yield per acre at the several Experimental Farms for Season of 1901. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B. C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B. C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | French Chevalier | 55 | 10 | 52 | 24 | 23 | 36 | 57 | 44 | 51 | 42 | 48 | 12 | 90 | 95 | 97 | 102 | 118 | $100\frac{3}{5}$ |
| 2 | Danish Chevalier | 47 | 4 | 38 | 16 | 19 | 8 | 57 | 4 | 47 | 4 | 41 | 36 | 93 | 96 | 96 | 102 | 115 | $100\frac{2}{5}$ |
| 3 | Beaver | 46 | 2 | 56 | 32 | 18 | 36 | 36 | 32 | 61 | 2 | 43 | 40 | 85 | 91 | 96 | 89 | 112 | $94\frac{1}{5}$ |
| 4 | Canadian Thorpe | 45 | 10 | 44 | 8 | 27 | 14 | 50 | 40 | 50 | 20 | 43 | 28 | 88 | 96 | 95 | 100 | 115 | $98\frac{1}{5}$ |
| 5 | Standwell | 42 | 34 | 45 | .. | 30 | 20 | 67 | 44 | 55 | 40 | 48 | 18 | 88 | 96 | 96 | 101 | 117 | $99\frac{3}{5}$ |
| 6 | Clifford | 41 | 42 | 33 | 16 | 39 | 8 | 54 | 8 | 46 | 22 | 43 | .. | 88 | 95 | 91 | 84 | 111 | $93\frac{1}{5}$ |
| 7 | Nepean | 41 | 2 | 37 | 24 | 31 | 32 | 58 | 16 | 52 | 24 | 44 | 10 | 88 | 96 | 93 | 91 | 115 | $96\frac{3}{5}$ |
| 8 | Logan | 39 | 18 | 35 | 40 | 35 | 20 | 54 | 28 | 51 | 12 | 43 | 14 | 88 | 96 | 96 | 89 | 111 | 96 |
| 9 | Kinver Chevalier | 36 | 22 | 33 | 16 | 17 | 24 | 55 | 40 | 50 | 40 | 38 | 38 | 90 | 96 | 97 | 103 | 117 | $100\frac{3}{5}$ |
| 10 | Gordon | 33 | 46 | 36 | 32 | 43 | 36 | 52 | 24 | 46 | 38 | 42 | 35 | 85 | 95 | 95 | 88 | 113 | $95\frac{1}{5}$ |
| 11 | Jarvis | 31 | 42 | 27 | 24 | 47 | 44 | 57 | 4 | 50 | 40 | 43 | 2 | 83 | 95 | 91 | 85 | 111 | 93 |
| 12 | Sidney | 31 | 22 | 38 | 16 | 25 | 40 | 61 | 32 | 37 | 44 | 39 | 2 | 87 | 96 | 90 | 87 | 117 | $95\frac{3}{5}$ |
| 13 | Prize Prolific | 31 | 12 | 42 | 24 | 24 | 8 | 56 | 32 | 59 | 8 | 42 | 36 | 93 | 95 | 96 | 102 | 119 | 101 |
| 14 | Dunham | 30 | 30 | 30 | 40 | 41 | 32 | 45 | 20 | 50 | .. | 39 | 34 | 85 | 96 | 91 | 86 | 112 | 94 |
| 15 | Invincible | 29 | 28 | 35 | 40 | 29 | 8 | 55 | 40 | 34 | 8 | 36 | 44 | 93 | 95 | 95 | 99 | 118 | 100 |
| 16 | Bolton | 25 | 10 | 45 | .. | 26 | 12 | 59 | 28 | 50 | 40 | 41 | 18 | 94 | 91 | 90 | 92 | 112 | $95\frac{4}{5}$ |
| 17 | Victor | 21 | 4 | [illegible] | 40 | 27 | 44 | 47 | 4 | 45 | 40 | 34 | 34 | 88 | 96 | 92 | 92 | 115 | $96\frac{3}{5}$ |
| 18 | Fulton | 20 | 10 | 30 | .. | 36 | 12 | 50 | 40 | 38 | 16 | 35 | 6 | 90 | 96 | 94 | 88 | 112 | 96 |
| 19 | Harvey | 14 | 38 | 36 | 32 | 42 | 24 | 57 | 24 | 51 | 2 | 40 | [illegible] | 97 | 96 | 94 | 83 | 111 | $96\frac{1}{5}$ |
| 20 | Leslie | 11 | 2 | 39 | 8 | 35 | 20 | 58 | [illegible] | 52 | 46 | 39 | [illegible] | 97 | 96 | 93 | 83 | 115 | $96\frac{4}{5}$ |
| 21 | Newton | * | | 45 | .. | 19 | 28 | 55 | 20 | 51 | 42 | 42 | 46 | .. | 96 | 97 | 101 | 113 | $101\frac{3}{4}$ |

* Not grown at Ottawa.

The six varieties of two-rowed barley which have given the largest crops during 1901 at the several experimental farms are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier.. .. .. .. .. .. .. | 57 | 44 | 4. Canadian Thorpe... .. .. .. .. .. .. | 45 | 10 |
| 2. Danish Chevalier... .. .. .. .. .. .. | 57 | 4 | 5. Standwell.. .. .. .. .. .. .. .. .. .. .. | 42 | 34 |
| 3. Beaver.. .. .. .. .. .. .. .. .. .. .. .. | 46 | 2 | 6. Clifford.. .. .. .. .. .. .. .. .. .. .. .. | 41 | 42 |

An average crop of 48 bushels 23 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver.. .. .. .. .. .. .. .. .. .. .. .. | 56 | 32 | 4. Newton.. .. .. .. .. .. .. .. .. .. .. .. | 45 | .. |
| 2. French Chevalier... .. .. .. .. .. .. | 52 | 24 | 5. Standwell.. .. .. .. .. .. .. .. .. .. .. | 45 | .. |
| 3. Bolton... .. .. .. .. .. .. .. .. .. .. .. | 45 | .. | 6. Canadian Thorpe... .. .. .. .. .. .. | 44 | 8 |

An average yield of 48 bushels 3 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Jarvis... .. .. .. .. .. .. .. .. .. .. .. | 47 | 44 | 4. Dunham.... .. .. .. .. .. .. .. .. .. .. | 41 | 32 |
| 2 Gordon.. .. .. .. .. .. .. .. .. .. .. .. | 43 | 36 | 5. Clifford.. .. .. .. .. .. .. .. .. .. .. .. | 39 | 8 |
| 3. Harvey.. .. .. .. .. .. .. .. .. .. .. .. | 42 | 24 | 6. Fulton... .. .. .. .. .. .. .. .. .. .. .. | 36 | 12 |

An average yield of 41 bushels 42 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Standwell.. .. .. .. .. .. .. .. .. .. .. | 67 | 44 | 4. Leslie... .. .. .. .. .. .. .. .. .. .. .. | 58 | 36 |
| 2. Sidney... .. .. .. .. .. .. .. .. .. .. .. | 61 | 32 | 5. Nepean.. .. .. .. .. .. .. .. .. .. .. .. | 58 | 16 |
| 3. Bolton... .. .. .. .. .. .. .. .. .. .. .. | 59 | 28 | 6 French Chevalier.. .. .. .. .. .. .. | 57 | 44 |

An average yield of 60 bushels 33 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Beaver.. .. .. .. .. .. .. .. .. .. .. .. | 61 | 2 | 4. Leslie... .. .. .. .. .. .. .. .. .. .. .. | 52 | 46 |
| 2. Prize Prolific.... .. .. .. .. .. .. .. | 59 | 8 | 5. Newton.. .. .. .. .. .. .. .. .. .. .. .. | 51 | 42 |
| 3. Standwell.. .. .. .. .. .. .. .. .. .. .. | 55 | 40 | 6. Logan... .. .. .. .. .. .. .. .. .. .. .. | 51 | 12 |

An average crop of 55 bushels 17 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest crops in 1901, taking the average results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Standwell.. .. .. .. .. .. .. .. .. .. .. | 48 | 18 | 4. Beaver... .. .. .. .. .. .. .. .. .. .. .. | 43 | 40 |
| 2. French Chevalier... .. .. .. .. .. .. | 48 | 12 | 5 Canadian Thorpe... .. .. .. .. .. .. | 43 | 28 |
| 3. Nepean.. .. .. .. .. .. .. .. .. .. .. .. | 44 | 10 | 6. Logan.... .. .. .. .. .. .. .. .. .. .. .. | 43 | 14 |

An average crop of 45 bushels 12 lbs. per acre.

The average crop of all the varieties of two-rowed barley tested at each of the experimental farms in 1901 was as follows :—At Ottawa, 33 bushels 40 lbs. per acre ; Nappan, 38 bushels 39 lbs.; Brandon, 30 bushels 31 lbs.; Indian Head, 54 bushels 40 lbs.; and at Agassiz, 49 bushels 18 lbs. The average return given by the whole of the varieties of two-rowed barley tested at all the farms was 41 bushels 24 lbs. per acre.

UNIFORM TEST PLOTS OF SIX-ROWED BARLEY.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms for Season of 1901. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Odessa | 41 | 2 | 60 | .. | 26 | 32 | 68 | 36 | 59 | 8 | 51 | 6 | 90 | 88 | 93 | 93 | 113 | 95⅖ |
| 2 | Mensury | 39 | 8 | 56 | 32 | 48 | 16 | 67 | 4 | 59 | 28 | 54 | 8 | 83 | 88 | 95 | 92 | 110 | 93⅗ |
| 3 | Stella | 36 | 42 | 38 | 16 | 21 | 32 | 51 | 12 | 47 | 14 | 39 | 4 | 90 | 96 | 95 | 91 | 113 | 97 |
| 4 | Claude | 36 | 42 | 52 | 24 | 38 | 36 | 66 | 12 | 60 | 40 | 51 | 2 | 90 | 88 | 95 | 89 | 112 | 94⅘ |
| 5 | Royal | 33 | 26 | 41 | 32 | 33 | 36 | 63 | 16 | 67 | 24 | 47 | 46 | 90 | 89 | 91 | 90 | 110 | 94 |
| 6 | Nugent | 33 | 6 | 47 | 24 | 33 | 36 | 55 | 40 | 61 | 12 | 46 | 14 | 90 | 89 | 94 | 100 | 113 | 97⅕ |
| 7 | Blue Long-head | 31 | 42 | 33 | 16 | 33 | 16 | 57 | 4 | 57 | 4 | 42 | 26 | 89 | 89 | 95 | 99 | 112 | 96⅘ |
| 8 | Rennie's Improved | 29 | 18 | 46 | 32 | 32 | 4 | 52 | 24 | 54 | 28 | 43 | 2 | 90 | 87 | 92 | 87 | 110 | 93⅕ |
| 9 | Petschora | 27 | 34 | 46 | 32 | 41 | 32 | 59 | 8 | 55 | 20 | 46 | 6 | 89 | 88 | 91 | 88 | 108 | 92⅘ |
| 10 | Pioneer | 27 | 34 | 44 | 8 | 27 | 24 | 54 | 8 | 52 | 16 | 41 | 8 | 94 | 88 | 90 | 98 | 110 | 96 |
| 11 | Vanguard | 27 | 34 | 47 | 24 | 29 | 28 | 45 | 40 | 47 | 14 | 39 | 28 | 90 | 89 | 89 | 87 | 110 | 93 |
| 12 | Albert | 26 | 42 | 50 | .. | 44 | 8 | 45 | 40 | 54 | 28 | 44 | 14 | 89 | 86 | 87 | 88 | 113 | 92⅗ |
| 13 | Garfield | 26 | 22 | 45 | 40 | 46 | 12 | 53 | 16 | 47 | 4 | 43 | 38 | 92 | 88 | 95 | 92 | 112 | 95⅘ |
| 14 | Yale | 26 | 2 | 50 | 40 | 47 | 4 | 48 | 36 | 58 | 36 | 46 | 14 | 94 | 93 | 91 | 92 | 113 | 96⅗ |
| 15 | Oderbruch | 26 | 2 | 61 | 32 | 29 | 28 | 53 | 16 | 51 | 44 | 44 | 24 | 92 | 88 | 92 | 85 | 107 | 92⅘ |
| 16 | Common | 26 | 2 | 64 | 8 | 29 | 8 | 53 | 36 | 60 | 40 | 46 | 38 | 89 | 86 | 89 | 89 | 113 | 93⅕ |
| 17 | Trooper | 25 | 10 | 41 | 32 | 29 | 8 | 59 | 28 | 50 | 40 | 41 | 14 | 91 | 91 | 95 | 89 | 113 | 95⅘ |
| 18 | Summit | 25 | 10 | 40 | 40 | 37 | 24 | 56 | 12 | 47 | 4 | 41 | 18 | 90 | 96 | 91 | 99 | 111 | 97⅖ |
| 19 | Phœnix | 25 | 10 | 42 | 24 | 44 | 8 | 40 | .. | 52 | 46 | 40 | 46 | 90 | 88 | 87 | 87 | 110 | 92⅖ |
| 20 | Baxter | 24 | 18 | 59 | 8 | 37 | 24 | 50 | .. | 55 | 32 | 44 | 45 | 89 | 88 | 91 | 87 | 108 | 92⅗ |
| 21 | Empire | 22 | 34 | 46 | 32 | 33 | 16 | 56 | 32 | 58 | 26 | 43 | 28 | 90 | 89 | 95 | 93 | 111 | 95⅗ |
| 22 | Argyle | 21 | 42 | 48 | 16 | 43 | 36 | 44 | 8 | 58 | 16 | 43 | 14 | 90 | 88 | 91 | 88 | 113 | 94 |
| 23 | Champion | ..... | | 47 | 24 | 30 | 40 | 47 | 4 | 51 | 4 | 44 | 6 | .... | 86 | 88 | 85 | 107 | 91 2/4 |
| 24 | Mansfield | ..... | | 40 | .. | 47 | 24 | 57 | 4 | 59 | 18 | 50 | 48 | .... | 93 | 87 | 92 | 115 | 96¾ |
| 25 | Excelsior | ..... | | 50 | .. | 40 | 40 | .. | .. | 54 | 28 | 48 | 23 | .... | 86 | 87 | .... | 107 | 93⅓ |
| 26 | Surprise | ..... | | 40 | .. | 32 | 4 | 46 | 12 | 45 | 40 | 41 | 2 | .... | 96 | 94 | 92 | 113 | 98¾ |
| 27 | Brome | ..... | | 45 | .. | 27 | 44 | 58 | 16 | 52 | 16 | 45 | 43 | .... | 93 | 95 | 91 | 113 | 98 |
| 28 | Hulless Black | ..... | | 50 | 40 | 36 | 32 | 45 | 40 | 45 | 20 | 44 | 44 | .... | 86 | 93 | 85 | 110 | 93 2/4 |
| 29 | Hulless White | ..... | | 46 | 32 | 16 | 12 | 37 | 4 | 45 | .. | 36 | 12 | .... | 86 | 87 | 84 | 110 | 91¾ |
| 30 | Success | ..... | | 49 | 8 | 29 | 28 | 41 | 12 | 50 | 30 | 42 | 31 | .... | 86 | 93 | 85 | 107 | 92¾ |

*Eight varieties of six-rowed barley were sown at the Central Experimental Farm in a hollow place where they were injured by water so as to make the results unreliable.

The six varieties of six-rowed barley which have given the largest crops during 1901 at the several experimental farms are the following —

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 41 | 2 | 4. Claude | 36 | 42 |
| 2. Mensury | 39 | 8 | 5. Royal | 33 | 26 |
| 3. Stella | 36 | 42 | 6. Nugent | 33 | 6 |

An average crop of 36 bushels 37 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Common | 64 | 8 | 4. Baxter | 59 | 8 |
| 2 Oderbruch | 61 | 32 | 5. Mensury | 56 | 32 |
| 3. Odessa | 60 | .. | 6. Claude | 52 | 24 |

An average crop of 59 bushels 1 lb. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 48 | 16 | 4. Garfield | 46 | 12 |
| 2. Mansfield | 47 | 24 | 5. Phœnix | 44 | 8 |
| 3. Yale | 47 | 4 | 6. Albert | 44 | 8 |

An average crop of 46 bushels 12 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 68 | 36 | 4. Royal | 63 | 16 |
| 2. Mensury | 67 | 4 | 5. Trooper | 59 | 28 |
| 3. Claude | 66 | 12 | 6. Petschora | 59 | 8 |

An average crop of 64 bushels 1 lb. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Royal | 67 | 24 | 4. Common | 60 | 40 |
| 2. Nugent | 61 | 12 | 5. Mensury | 59 | 28 |
| 3. Claude | 60 | 40 | 6. Mansfield | 59 | 18 |

An average crop of 61 bushels 27 lbs. per acre.

The six varieties which have produced the largest crops in 1901, taking the average of the results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 54 | 8 | 4. Mansfield | 50 | 48 |
| 2. Odessa | 51 | 6 | 5. Excelsior | 48 | 23 |
| 3. Claude | 51 | 2 | 6. Royal | 47 | 46 |

An average crop of 50 bushels 30 lbs. per acre.

The average crop of all the varieties of six-rowed barley tested at each of the experimental farms in 1901 was as follows :—At Ottawa, 29 bushels 7 lbs. per acre ; Nappan, 47 bushels 41 lbs.; Brandon, 35 bushels 1 lb.; Indian Head, 52 bushels 46 lbs., and at Agassiz, 54 bushels 2 lbs. The average returns given by the whole of the varieties of six-rowed barley tested at all the farms was 44 bushels 29 lbs. per acre.

## TRIAL PLOTS OF SPRING WHEAT.

Seventy-one varieties of spring wheat were grown on the uniform trial plots during 1901. Among the new sorts added to the list this year are four promising kinds received under numbers from Prof. Wm. Hays, of St. Anthony's Park, Minnesota, a number of varieties from Australia and eight cross-bred sorts which have been produced at the experimental farms. The cross-bred sorts now under test in these trial plots number thirty-eight in all, as follows :—Admiral, Advance, Alpha, Angus, Beauty, Benton, Bishop, Blair, Blenheim, Byron, Captor, Cartier, Cassel, Chester, Clyde, Countess, Crawford, Crown, Dawn, Dufferin, Early Riga, Ebert, Essex, Fraser, Harold, Hastings, Huron, Laurel, Mason, Norval, Percy, Plumper, Preston, Progress, Rideau, Stanley, Weldon and Vernon.

The size of the plots was one-fortieth of an acre each at Ottawa, Nappan and Agassiz, and one-twentieth of an acre at Brandon and Indian Head, and the quantity of seed sown was in the proportion of one and one-half bushels per acre. The dates of sowing were as follows :—At Ottawa, April 18 ; Nappan, May 1 ; Brandon, May 2 and 3 ; Indian Head, May 7, and at Agassiz, April 16 to 22.

### UNIFORM TEST PLOTS OF SPRING WHEAT.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms Season of 1901. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Goose | 33 | 50 | 26 | .. | 42 | .. | 63 | .. | 37 | 40 | 40 | 30 | 110 | 112 | 112 | 114 | 126 | 114 4/5 |
| 2 | Hastings | 33 | 50 | 34 | 40 | 20 | 40 | 57 | 20 | 50 | .. | 39 | 18 | 101 | 112 | 109 | 109 | 119 | 110 |
| 3 | Huron | 32 | .. | 25 | 20 | 35 | 20 | 66 | 40 | 44 | 20 | 40 | 44 | 104 | 111 | 107 | 108 | 125 | 111 |
| 4 | Herisson Bearded | 32 | .. | 32 | .. | 26 | 40 | 57 | 20 | 37 | .. | 37 | .. | 105 | 111 | 105 | 113 | 125 | 111 4/5 |
| 5 | White Fife | 31 | 10 | 30 | .. | 34 | 20 | 52 | .. | 40 | .. | 37 | 30 | 110 | 113 | 109 | 104 | 123 | 111 4/5 |
| 6 | Beaudry | 29 | 50 | 34 | 40 | 25 | 40 | 60 | 40 | 31 | .. | 36 | 22 | 110 | 109 | 103 | 110 | 123 | 111 |
| 7 | Australian No. 19 | 29 | 10 | 20 | .. | 18 | .. | 56 | 40 | 45 | 20 | 33 | 50 | 112 | 118 | 112 | 108 | 119 | 113 4/5 |
| 8 | Red Fife | 29 | 10 | 27 | 20 | 36 | 40 | 57 | .. | 40 | 30 | 38 | 8 | 109 | 111 | 111 | 110 | 123 | 112 4/5 |
| 9 | Hungarian | 29 | 10 | 34 | .. | 29 | 40 | 56 | 40 | 44 | 40 | 38 | 50 | 105 | 111 | 109 | 111 | 126 | 112 2/5 |
| 10 | Preston | 28 | 40 | 33 | 20 | 31 | .. | 57 | 20 | 44 | .. | 38 | 52 | 104 | 110 | 106 | 114 | 123 | 111 2/5 |
| 11 | Minnesota No. 181 | 28 | 40 | 29 | 20 | 25 | .. | 60 | .. | 43 | .. | 37 | 12 | 105 | 113 | 112 | 110 | 126 | 113 1/5 |
| 12 | Beauty | 28 | 30 | 24 | 40 | 35 | 40 | 58 | 40 | 42 | .. | 37 | 54 | 111 | 113 | 111 | 105 | 123 | 112 1/5 |
| 13 | Dion's | 27 | 50 | 26 | 40 | 27 | 20 | 59 | 20 | 36 | 40 | 35 | 34 | 111 | 111 | 108 | 108 | 123 | 112 1/5 |
| 14 | White Chaff, Campbell's | 27 | 50 | 30 | .. | 33 | .. | 56 | .. | 38 | 10 | 37 | .. | 106 | 110 | 108 | 108 | 125 | 111 2/5 |
| 15 | Plumper | 27 | 20 | 32 | 40 | 31 | 20 | 51 | .. | 41 | 20 | 36 | 44 | 104 | 111 | 110 | 107 | 126 | 111 3/5 |
| 16 | Australian No. 13 | 27 | 10 | 24 | .. | 36 | .. | 66 | 40 | 39 | 40 | 38 | 42 | 113 | 118 | 111 | 109 | 115 | 113 1/5 |
| 17 | Australian No. 10 | 26 | 30 | 27 | 20 | 25 | 20 | 48 | 40 | 40 | 40 | 33 | 42 | 111 | 118 | 112 | 108 | 116 | 113 |
| 18 | Clyde | 26 | 30 | 34 | .. | 36 | 40 | 60 | 40 | 36 | .. | 38 | 46 | 104 | 112 | 102 | 102 | 126 | 109 1/5 |
| 19 | Crown | 26 | 30 | 34 | 40 | 38 | .. | 50 | .. | 39 | 40 | 37 | 46 | 105 | 112 | 106 | 109 | 125 | 111 2/5 |
| 20 | Rio Grande | 25 | 10 | 30 | 40 | 33 | .. | 62 | .. | 35 | 40 | 37 | 18 | 111 | 111 | 107 | 114 | 122 | 113 |
| 21 | Blenhein | 24 | 40 | 28 | 40 | 32 | 20 | 54 | .. | 38 | .. | 35 | 32 | 105 | 111 | 106 | 111 | 123 | 111 1/5 |
| 22 | Percy | 24 | .. | 30 | .. | 29 | 20 | 57 | 20 | 37 | .. | 35 | 32 | 104 | 111 | 99 | 103 | 123 | 108 |
| 23 | Chester | 23 | 50 | 30 | 40 | 19 | 20 | 50 | 40 | 49 | 20 | 34 | 46 | 105 | 112 | 111 | 108 | 117 | 110 3/5 |
| 24 | Minnesota, No. 169 | 23 | 20 | 22 | 40 | 32 | 40 | 57 | 20 | 46 | 40 | 36 | 32 | 106 | 113 | 111 | 111 | 125 | 113 1/5 |

## UNIFORM TEST PLOTS OF SPRING WHEAT—*Concluded.*

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms Season of 1901. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 25 | Pringle's Champlain | 23 | 20 | 30 | .. | 29 | 20 | 56 | 40 | 42 | 20 | 36 | 20 | 104 | 110 | 106 | 111 | 125 | $111\frac{1}{5}$ |
| 26 | Minnesota, No. 163 | 23 | 20 | 30 | .. | 34 | .. | 58 | .. | 38 | 40 | 36 | 48 | 106 | 113 | 111 | 109 | 126 | 113 |
| 27 | Wellman's Fife | 23 | 10 | 28 | 40 | 34 | 40 | 57 | 40 | 36 | 20 | 36 | 6 | 110 | 113 | 109 | 109 | 125 | $113\frac{1}{5}$ |
| 28 | Australian, No. 27 | 23 | 10 | 24 | 40 | 17 | 20 | 58 | .. | 39 | 40 | 32 | 34 | 110 | 118 | 110 | 106 | 117 | $112\frac{1}{5}$ |
| 29 | Cartier | 23 | 10 | 24 | 40 | 28 | .. | 44 | 40 | 48 | 40 | 33 | 50 | 105 | 112 | 102 | 106 | 117 | $108\frac{2}{5}$ |
| 30 | Roumanian | 23 | 10 | 40 | .. | 35 | 40 | 57 | 20 | 52 | .. | 41 | 38 | 111 | 113 | 112 | 112 | 126 | $114\frac{4}{5}$ |
| 31 | Early Riga | 22 | 40 | 26 | 40 | 27 | 20 | 49 | .. | 46 | 20 | 34 | 24 | 94 | 107 | 96 | 98 | 118 | $102\frac{3}{5}$ |
| 32 | Red Fern | 22 | 30 | 32 | 40 | 28 | .. | 57 | 20 | 40 | 40 | 36 | 14 | 106 | 111 | 110 | 113 | 126 | $113\frac{1}{5}$ |
| 33 | Colorado | 22 | .. | 34 | .. | 31 | 20 | 58 | 20 | 44 | 40 | 38 | 4 | 105 | 110 | 106 | 113 | 122 | $111\frac{1}{5}$ |
| 34 | Dawn | 22 | .. | 26 | .. | 33 | 20 | 61 | .. | 39 | 20 | 36 | 20 | 104 | 111 | 101 | 105 | 123 | $108\frac{4}{5}$ |
| 35 | Captor | 22 | .. | 23 | 20 | 18 | .. | 50 | 20 | 47 | .. | 32 | 8 | 105 | 113 | 103 | 108 | 125 | $110\frac{4}{5}$ |
| 36 | Rideau | 22 | .. | 28 | 40 | 33 | .. | 62 | 40 | 36 | 20 | 36 | 32 | 105 | 112 | 105 | 107 | 119 | $109\frac{3}{5}$ |
| 37 | Australian, No. 23 | 21 | 50 | 22 | 40 | 19 | 20 | 58 | 40 | 46 | 30 | 33 | 48 | 111 | 118 | 111 | 108 | 118 | $113\frac{1}{5}$ |
| 38 | Speltz | 21 | 50 | 28 | .. | 45 | 20 | 58 | 20 | 39 | 30 | 38 | 36 | 111 | 113 | 108 | 102 | 104 | $107\frac{3}{5}$ |
| 39 | Laurel | 21 | 10 | 30 | .. | 35 | .. | 54 | .. | 45 | 20 | 37 | 6 | 112 | 113 | 111 | 111 | 126 | $114\frac{3}{5}$ |
| 40 | White Connell | 21 | 10 | 34 | .. | 34 | .. | 55 | 20 | 37 | 40 | 36 | 26 | 112 | 113 | 111 | 109 | 126 | $114\frac{1}{5}$ |
| 41 | White Russian | 21 | 10 | 33 | 20 | 36 | .. | 54 | .. | 38 | .. | 36 | 30 | 111 | 113 | 111 | 105 | 126 | $113\frac{1}{5}$ |
| 42 | Admiral | 21 | 10 | 33 | 20 | 37 | 20 | 56 | 20 | 41 | 20 | 37 | 54 | 112 | 112 | 108 | 108 | 125 | 113 |
| 43 | Alpha | 20 | 40 | 33 | 20 | 35 | .. | 53 | 40 | 46 | 40 | 37 | 52 | 105 | 112 | 103 | 110 | 125 | 111 |
| 44 | Robin's Rust Proof | 20 | 40 | 20 | 40 | 26 | .. | 49 | 20 | 43 | 20 | 32 | .. | 112 | 113 | 111 | 112 | 117 | 113 |
| 45 | Benton | 20 | 40 | 20 | .. | 33 | 20 | 49 | 20 | 44 | 30 | 33 | 34 | 105 | 113 | 103 | 108 | 116 | 109 |
| 46 | Advance | 20 | 40 | 35 | 20 | 34 | 20 | 57 | .. | 43 | 20 | 38 | 8 | 104 | 109 | 103 | 110 | 118 | $108\frac{4}{5}$ |
| 47 | Monarch | 20 | 30 | 30 | 40 | 36 | 20 | 57 | 40 | 37 | 20 | 36 | 30 | 110 | 113 | 109 | 110 | 126 | $113\frac{3}{5}$ |
| 48 | Blair | 20 | .. | 32 | 40 | 30 | 20 | 55 | .. | 51 | 10 | 37 | 50 | 105 | 113 | 112 | 104 | 125 | $111\frac{4}{5}$ |
| 49 | Countess | 20 | .. | 28 | 40 | 26 | 20 | 65 | 20 | 50 | 40 | 38 | 12 | 106 | 113 | 111 | 103 | 123 | $111\frac{1}{5}$ |
| 50 | Red Swedish | 19 | 50 | 30 | .. | 24 | 20 | 49 | .. | 42 | 20 | 33 | 6 | 111 | 110 | 109 | 114 | 123 | $113\frac{2}{5}$ |
| 51 | Progress | 19 | 50 | 25 | 20 | 37 | .. | 54 | .. | 39 | 10 | 35 | 4 | 101 | 112 | 106 | 105 | 125 | $109\frac{4}{5}$ |
| 52 | Australian, No. 25 | 19 | 50 | 26 | 40 | 21 | 20 | 54 | .. | 44 | 40 | 33 | 18 | 111 | 118 | 112 | 107 | 117 | 113 |
| 53 | Minnesota, No. 149 | 19 | 40 | 22 | .. | 33 | 40 | 59 | 20 | 41 | 40 | 35 | 16 | 106 | 113 | 112 | 109 | 126 | $113\frac{1}{5}$ |
| 54 | Harold | 19 | 40 | 30 | 40 | 23 | 20 | 48 | .. | 35 | 20 | 31 | 24 | 94 | 111 | 107 | 100 | 116 | $105\frac{3}{5}$ |
| 55 | Australian, No, 9 | 19 | 30 | 20 | .. | 30 | .. | 50 | 40 | 48 | 40 | 33 | 46 | 106 | 118 | 109 | 107 | 118 | $111\frac{3}{5}$ |
| 56 | Stanley | 19 | 20 | 30 | 40 | 36 | .. | 61 | 40 | 50 | 40 | 39 | 40 | 104 | 112 | 106 | 105 | 126 | $110\frac{3}{5}$ |
| 57 | Norval | 19 | 20 | 34 | .. | 34 | 40 | 45 | 40 | 38 | 20 | 34 | 24 | 101 | 111 | 101 | 104 | 116 | $106\frac{4}{5}$ |
| 58 | Dufferin | 19 | 10 | 24 | 40 | 30 | 40 | 58 | .. | 46 | 10 | 35 | 44 | 105 | 112 | 103 | 111 | 118 | $109\frac{3}{5}$ |
| 59 | Essex | 19 | 10 | 24 | 40 | 24 | .. | 61 | 20 | 47 | 20 | 35 | 18 | 112 | 113 | 109 | 109 | 119 | $112\frac{3}{5}$ |
| 60 | Crawford | 19 | . | 26 | 40 | 28 | .. | 55 | .. | 47 | 20 | 35 | 12 | 101 | 112 | 105 | 99 | 119 | $107\frac{1}{5}$ |
| 61 | Fraser | 18 | 40 | 26 | 40 | 27 | 20 | 52 | .. | 41 | 40 | 33 | 16 | 95 | 111 | 105 | 100 | 118 | $105\frac{4}{5}$ |
| 62 | Angus | 18 | 40 | 24 | 40 | 30 | 40 | 46 | .. | 39 | 40 | 31 | 56 | 105 | 112 | 106 | 110 | 117 | 110 |
| 63 | Weldon | 18 | 40 | 35 | 20 | 31 | 40 | 57 | 40 | 41 | 20 | 36 | 56 | 105 | 113 | 111 | 102 | 122 | $110\frac{3}{5}$ |
| 64 | Byron | 17 | 50 | 30 | .. | 30 | 40 | 43 | 40 | 34 | .. | 31 | 14 | 104 | 113 | 107 | 103 | 119 | $109\frac{1}{5}$ |
| 65 | Japanese | 17 | 20 | 32 | 40 | 16 | 40 | 56 | 40 | 40 | 10 | 32 | 42 | 97 | 112 | 99 | 108 | 119 | 107 |
| 66 | Cassel | 17 | 10 | 26 | .. | 20 | 40 | 54 | .. | 44 | 50 | 32 | 32 | 112 | 112 | 112 | 108 | 121 | 113 |
| 67 | Vernon | 17 | 10 | 33 | 20 | 35 | 40 | 59 | 20 | 44 | 40 | 38 | 2 | 105 | 110 | 110 | 111 | 119 | 111 |
| 68 | Mason | 16 | 40 | 32 | .. | 31 | .. | 67 | .. | 40 | 20 | 37 | 24 | 105 | 112 | 105 | 104 | 125 | $110\frac{1}{5}$ |
| 69 | Ebert | 15 | 20 | 26 | 40 | 28 | . | 50 | 20 | 51 | 30 | 34 | 22 | 95 | 112 | 102 | 99 | 120 | $105\frac{3}{5}$ |
| 70 | Ladoga | 14 | 40 | 26 | 40 | 27 | .. | 55 | 40 | 41 | 20 | 33 | 4 | 100 | 108 | 105 | 107 | 118 | $107\frac{3}{5}$ |
| 71 | Bishop | 13 | 50 | 26 | .. | 24 | 40 | 52 | .. | 42 | .. | 31 | 42 | 105 | 113 | 106 | 106 | 120 | 110 |

The twelve varieties of spring wheat which have given the largest crops at the several experimental farms in 1901 are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Goose | 33 | 50 | 7. Australian, No. 19 | 29 | 10 |
| 2. Hastings | 33 | 50 | 8. Red Fife | 29 | 10 |
| 3. Huron | 32 | .. | 9. Hungarian | 29 | 10 |
| 4. Herisson Bearded | 32 | .. | 10. Preston | 28 | 40 |
| 5. White Fife | 31 | 10 | 11. Minnesota, No. 181 | 28 | 40 |
| 6. Beaudry | 29 | 50 | 12. Beauty | 28 | 30 |

An average crop of 30 bushels 30 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Roumanian | 40 | .. | 7. Hungarian | 34 | .. |
| 2. Weldon | 35 | 20 | 8. Colorado | 34 | .. |
| 3. Advance | 35 | 20 | 9. White Connell | 34 | .. |
| 4. Hastings | 34 | 40 | 10. Norval | 34 | .. |
| 5. Beaudry | 34 | 40 | 11. Clyde | 34 | .. |
| 6. Crown | 34 | 40 | 12. Preston | 33 | 20 |

An average crop of 34 bushels 50 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Goose | 42 | .. | 7. Monarch | 36 | 20 |
| 2. Crown | 38 | .. | 8. Stanley | 36 | .. |
| 3. Admiral | 37 | 20 | 9. White Russian | 36 | .. |
| 4. Progress | 37 | .. | 10. Australian, No. 13 | 36 | .. |
| 5. Clyde | 36 | 40 | 11. Vernon | 35 | 40 |
| 6. Red Fife | 36 | 40 | 12. Beauty | 35 | 40 |

An average crop of 36 bushels 57 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mason | 67 | .. | 7. Rio Grande | 62 | .. |
| 2. Huron | 66 | 40 | 8. Stanley | 61 | 40 |
| 3. Australian, No. 13 | 66 | 40 | 9. Essex | 61 | 20 |
| 4. Countess | 65 | 20 | 10. Crown | 61 | .. |
| 5. Goose | 63 | .. | 11. Clyde | 60 | 40 |
| 6. Rideau | 62 | 40 | 12. Beaudry | 60 | 40 |

An average crop of 63 bushels 13 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Roumanian | 52 | .. | 7. Chester | 49 | 20 |
| 2. Ebert | 51 | 30 | 8. Cartier | 48 | 40 |
| 3. Blair | 51 | 10 | 9. Australian, No. 9 | 48 | 40 |
| 4. Stanley | 50 | 40 | 10. Essex | 47 | 20 |
| 5. Countess | 50 | 40 | 11. Crawford | 47 | 20 |
| 6. Hastings | 50 | .. | 12. Captor | 47 | .. |

An average crop of 49 bushels 32 lbs. per acre.

The twelve varieties of spring wheat which have given the largest crops in 1901, taking the average of the results obtained on all the experimental farms, are :

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1 Roumanian.... .. .. .. .. .. .. .. .. | 41 | 38 | 7. Hungarian.... .. .. .. .. .. .. .... | 38 | 50 |
| 2. Huron... .. .. .. .. .. .. .. .. .. .. | 40 | 44 | 8. Clyde... .. .. .. .. .. .. .. .. .. .. | 38 | 46 |
| 3. Goose.... .. .. .. .. .. .. .. .. .. .. | 40 | 30 | 9. Australian, No. 13.... .. .. .. .. | 38 | 42 |
| 4 Stanley.... .. .. .. .. .. .. .. .. .. | 39 | 40 | 10. Speltz.. .. .. .. .. .. .. .. .. .. .. | 38 | 36 |
| 5. Hastings... .. .. .. .. .. .. .. .. .. | 39 | 18 | 11. Countess.. .. .. .. .. .. .. .. .. | 38 | 12 |
| 6. Preston.... .. .. .. .. .. .. .. .. .. | 38 | 52 | 12. Red Fife.. .. .. .. .. .. .. .. .. | 38 | 8 |

An average crop of 39 bushels 20 lbs. per acre.

The average crop of all the varieties of spring wheat, tested at each of the experimental farms in 1901, was as follows :—At Ottawa, 22 bushels 50 lbs. per acre ; Nappan, 28 bushels 53 lbs.; Brandon, 30 bushels 9 lbs.; Indian Head, 55 bushels 49 lbs., and Agassiz, 42 bushels 14 lbs. The average return given by the whole of the varieties of spring wheat at all the farms was 35 bushels 59 lbs. per acre.

## TRIAL PLOTS OF PEASE.

The varieties of pease under test in 1901 in the uniform trial plots numbered fifty-seven. Among these there are thirty cross-bred sorts which have been originated at the experimental farms. These are Agnes, Alma, Archer, Arthur, Bedford, Bright, Bruce, Carleton, Chelsea, Cooper, Dover, Duke, Elder Elliot, Fenton, Fergus, Gregory, Herald, Kent, King, Lanark, Mackay, Macoun, Nelson, Pearl, Perth, Picton, Prince, Trilby and Vincent. These were sown in plots of one-fortieth of an acre each at Ottawa, Nappan and Agassiz, and one-twentieth of an acre at Brandon and Indian Head. The quantity of seed used per acre has varied from two to three bushels, depending on the size of the pea. The dates of sowing were as follows :—Ottawa, April 29 ; Nappan, May 2 ; Brandon, May 4 to 8 ; Indian Head, May 15, and at Agassiz, April 15.

## UNIFORM TEST PLOTS OF PEASE.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms Season of 1901. | | | | | | | | | | | | Number of Days from Sowing to Harvesting. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | | Ottawa, Ont. | Nappan, N.S. | Brandon, Man. | Indian Head, N.W.T. | Agassiz, B.C. | Average of all Farms. |
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Days. | Days. | Days. | Days. | Days. | Days. |
| 1 | Cooper | 33 | 20 | 41 | 20 | 36 | .. | 50 | 40 | 47 | 10 | 41 | 42 | 108 | 113 | 122 | 115 | 130 | 117 3/5 |
| 2 | English Grey | 32 | .. | 36 | 40 | 29 | 50 | 48 | 20 | 64 | .. | 42 | 10 | 108 | 120 | 127 | 112 | 128 | 119 |
| 3 | Paragon | 32 | .. | 43 | 20 | 43 | .. | 59 | 40 | 49 | 40 | 45 | 32 | 95 | 108 | 121 | 118 | 130 | 114 2/5 |
| 4 | Nelson | 32 | .. | 42 | 40 | 36 | 10 | 51 | .. | 54 | .. | 43 | 10 | 99 | 108 | 108 | 119 | 123 | 111 2/5 |
| 5 | French Canner | 31 | 40 | 40 | 40 | 33 | .. | 49 | 40 | 50 | .. | 41 | .. | 105 | 118 | 108 | 113 | 128 | 114 2/5 |
| 6 | Bruce | 31 | 40 | 42 | 40 | 31 | 50 | 51 | 20 | 52 | 30 | 42 | .. | 111 | 118 | 113 | 118 | 127 | 117 2/5 |
| 7 | Centennial | 31 | 20 | 35 | 20 | 29 | 50 | 49 | .. | 50 | 40 | 39 | 14 | 113 | 113 | 129 | 113 | 131 | 119 1/5 |
| 8 | Vincent | 30 | 40 | 35 | 20 | 32 | .. | 47 | .. | 49 | 50 | 38 | 58 | 113 | 119 | 104 | 116 | 127 | 115 4/5 |
| 9 | Elder | 30 | 40 | 46 | 40 | 16 | 30 | 40 | 20 | 52 | 40 | 37 | 22 | 107 | 121 | 129 | 118 | 130 | 121 |
| 10 | Chancellor | 30 | 40 | 45 | 20 | 30 | 40 | 50 | .. | 48 | .. | 40 | 56 | 96 | 107 | 111 | 107 | 130 | 110 1/5 |
| 11 | Kent | 30 | 40 | 42 | 40 | 31 | .. | 52 | .. | 52 | .. | 41 | 40 | 107 | 121 | 124 | 116 | 133 | 120 1/5 |
| 12 | Arthur | 30 | .. | 50 | .. | 35 | 50 | 50 | 20 | 51 | 50 | 43 | 36 | 108 | 112 | 115 | 113 | 127 | 115 |
| 13 | Victoria | 30 | .. | 48 | .. | 41 | 20 | 45 | 20 | 47 | .. | 42 | 20 | 114 | 119 | 126 | 118 | 127 | 120 4/5 |
| 14 | Carleton | 30 | .. | 36 | 40 | 34 | 50 | 50 | 40 | 52 | 20 | 40 | 54 | 107 | 118 | 124 | 116 | 130 | 119 |
| 15 | Alma | 30 | .. | 36 | 40 | 37 | 20 | 47 | 40 | 51 | 20 | 40 | 36 | 107 | 108 | 114 | 116 | 127 | 114 2/5 |
| 16 | Elliot | 30 | .. | 44 | 40 | 38 | 30 | 50 | 20 | 42 | 20 | 41 | 10 | 106 | 118 | 125 | 118 | 133 | 120 |
| 17 | King | 29 | 20 | 41 | 20 | 38 | 50 | 56 | .. | 47 | 20 | 42 | 34 | 111 | 113 | 116 | 109 | 131 | 116 |
| 18 | Canadian Beauty | 29 | 20 | 33 | 20 | 34 | 40 | 49 | 40 | 37 | 20 | 36 | 52 | 106 | 112 | 126 | 116 | 130 | 118 |
| 19 | Picton | 29 | 20 | 42 | .. | 41 | 20 | 48 | .. | 52 | 10 | 42 | 34 | 108 | 119 | 115 | 109 | 131 | 116 2/5 |
| 20 | Golden Vine | 29 | .. | 40 | .. | 35 | .. | 53 | 20 | 48 | 20 | 41 | 8 | 106 | 111 | 119 | 115 | 133 | 116 4/5 |
| 21 | Lanark | 29 | .. | 40 | .. | 33 | 50 | 52 | 20 | 49 | 20 | 40 | 54 | 105 | 119 | 121 | 113 | 130 | 117 3/5 |
| 22 | Bright | 28 | .. | 46 | .. | 25 | 40 | 46 | .. | 39 | 20 | 37 | .. | 109 | 118 | 128 | 120 | 133 | 121 3/5 |
| 23 | Bedford | 28 | .. | 25 | 20 | 30 | 20 | 43 | 20 | 44 | 40 | 34 | 20 | 108 | 118 | 119 | 116 | 131 | 118 2/5 |
| 24 | Large White Marrowfat | 28 | .. | 43 | 20 | 31 | .. | 51 | 20 | 55 | 20 | 41 | 48 | 107 | 118 | 127 | 117 | 131 | 120 |
| 25 | Perth | 28 | .. | 40 | .. | 35 | 40 | 48 | 40 | 56 | .. | 41 | 40 | 107 | 111 | 118 | 114 | 130 | 116 |
| 26 | Prussian Blue | 27 | 20 | 40 | 40 | 36 | 20 | 50 | 40 | 48 | 40 | 40 | 44 | 99 | 108 | 115 | 111 | 126 | 111 4/5 |
| 27 | Mackay | 27 | 20 | 42 | .. | 29 | .. | 45 | 20 | 58 | 50 | 40 | 30 | 103 | 119 | 124 | 119 | 128 | 118 3/5 |
| 28 | Pride | 27 | 20 | 46 | 40 | 34 | 20 | 60 | 20 | 59 | 20 | 45 | 36 | 105 | 118 | 119 | 115 | 130 | 117 2/5 |
| 29 | Mummy | 27 | 20 | 36 | 40 | 39 | 40 | 50 | .. | 44 | .. | 39 | 32 | 108 | 117 | 122 | 110 | 131 | 117 3/5 |
| 30 | Pearl | 27 | 20 | 50 | .. | 27 | 20 | 46 | 20 | 48 | .. | 39 | 48 | 114 | 121 | 126 | 119 | 130 | 122 |
| 31 | Prince | 26 | 40 | 38 | .. | 38 | .. | 49 | 40 | 54 | .. | 41 | 16 | 106 | 108 | 126 | 111 | 127 | 115 3/5 |
| 32 | Daniel O'Rourke | 26 | 40 | 38 | 40 | 29 | 40 | 59 | .. | 48 | 10 | 40 | 26 | 98 | 115 | 116 | 107 | 122 | 111 3/5 |
| 33 | Creeper | 26 | 40 | 38 | 40 | 31 | 50 | 47 | .. | 48 | 40 | 38 | 34 | 105 | 107 | 103 | 114 | 122 | 110 1/5 |
| 34 | New Potter | 26 | 40 | 42 | .. | 41 | 20 | 51 | .. | 57 | 20 | 43 | 40 | 113 | 117 | 130 | 116 | 128 | 120 4/5 |
| 35 | Wisconsin Blue | 26 | .. | 42 | 40 | 33 | 30 | 44 | 20 | 47 | 40 | 38 | 50 | 110 | 118 | 116 | 113 | 133 | 118 |
| 36 | Duke | 26 | .. | 42 | 40 | 35 | 20 | 46 | 40 | 60 | .. | 42 | 8 | 108 | 113 | 105 | 116 | 130 | 114 2/5 |
| 37 | Oddfellow | 26 | .. | 43 | 20 | 33 | 20 | 66 | .. | 41 | 20 | 42 | .. | 108 | 118 | 111 | 113 | 125 | 115 |
| 38 | Agnes | 26 | .. | 44 | 40 | 33 | 10 | 53 | 40 | 56 | 50 | 42 | 52 | 107 | 118 | 119 | 112 | 131 | 117 2/5 |
| 39 | Black-eyed Marrowfat | 25 | 40 | 38 | .. | 30 | . | 50 | 20 | 47 | 10 | 38 | 14 | 112 | 117 | 105 | 114 | 127 | 115 |
| 40 | White Wonder | 25 | 20 | 41 | 20 | 33 | 20 | 57 | .. | 54 | 20 | 42 | 16 | 100 | 107 | 108 | 104 | 131 | 110 |
| 41 | Archer | 25 | .. | 42 | .. | 34 | 20 | 48 | 20 | 45 | 20 | 39 | .. | 111 | 113 | 124 | 116 | 131 | 119 |
| 42 | Macoun | 24 | 40 | 42 | 40 | 41 | 40 | 51 | 20 | 42 | .. | 40 | 28 | 112 | 118 | 127 | 119 | 130 | 121 1/5 |
| 43 | Multiplier | 24 | 40 | 43 | 20 | 28 | 40 | 40 | 40 | 46 | 30 | 36 | 46 | 112 | 118 | 127 | 113 | 131 | 120 1/5 |
| 44 | Gregory | 24 | 40 | 48 | 40 | 42 | 30 | 58 | 40 | 55 | .. | 45 | 54 | 104 | 118 | 126 | 113 | 126 | 117 2/5 |
| 45 | Early Britain | 24 | 40 | 40 | .. | 36 | 20 | 53 | .. | 59 | 20 | 42 | 40 | 106 | 107 | 117 | 116 | 122 | 113 3/5 |
| 46 | Crown | 24 | 20 | 44 | .. | 38 | 30 | 54 | 20 | 52 | 30 | 42 | 44 | 106 | 115 | 124 | 114 | 128 | 117 2/5 |
| 47 | Harrison's Glory | 24 | .. | 38 | .. | 35 | .. | 46 | .. | 60 | 40 | 40 | 44 | 104 | 108 | 116 | 118 | 129 | 115 |
| 48 | Elephant Blue | 24 | .. | 40 | .. | 28 | 20 | 52 | .. | 57 | .. | 40 | 16 | 106 | 108 | 127 | 114 | 126 | 116 1/5 |
| 49 | Prince Albert | 24 | .. | 43 | 20 | 31 | .. | 49 | 20 | 56 | 40 | 40 | 52 | 114 | 117 | 130 | 113 | 128 | 120 2/5 |
| 50 | Fergus | 24 | .. | 45 | 20 | 29 | 40 | 47 | 40 | 59 | .. | 41 | 8 | 110 | 121 | 104 | 116 | 133 | 116 4/5 |
| 51 | Chelsea | 23 | 40 | 42 | .. | 34 | 20 | 39 | 20 | 38 | 40 | 35 | 36 | 112 | 121 | 123 | 113 | 128 | 119 2/5 |
| 52 | Dover | 22 | 40 | 42 | 40 | 33 | .. | 49 | .. | 38 | 40 | 37 | 12 | 108 | 119 | 125 | 116 | 130 | 119 3/5 |
| 53 | Herald | 21 | 20 | 42 | 40 | 28 | 30 | 41 | 20 | 46 | 40 | 36 | 6 | 113 | 120 | 124 | 113 | 130 | 120 |
| 54 | Fenton | 20 | .. | 36 | 40 | 36 | 40 | 54 | 40 | 40 | 20 | 37 | 40 | 103 | 118 | 119 | 113 | 123 | 115 1/5 |
| 55 | Trilby | 19 | 20 | 37 | 20 | 32 | .. | 53 | .. | 52 | 50 | 38 | 54 | 105 | 119 | 127 | 116 | 127 | 118 4/5 |
| 56 | German White | 18 | 20 | 40 | .. | 38 | 40 | 60 | .. | 52 | .. | 41 | 48 | 100 | 111 | 117 | 107 | 128 | 112 3/5 |
| 57 | Grass Pea | 16 | 40 | 22 | .. | 32 | 20 | 36 | .. | 24 | 40 | 26 | 20 | 114 | 121 | 127 | 120 | 141 | 124 3/5 |

The twelve varieties of pease which have given the largest crops at the several experimental farms during 1901, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Cooper | 33 | 20 | 7. Centennial | 31 | 20 |
| 2. English Grey | 32 | .. | 8. Vincent | 30 | 40 |
| 3. Paragon | 32 | .. | 9. Elder | 30 | 40 |
| 4. Nelson | 32 | .. | 10. Chancellor | 30 | 40 |
| 5. French Canner | 31 | 40 | 11. Kent | 30 | 40 |
| 6. Bruce | 31 | 40 | 12. Arthur | 30 | .. |

An average crop of 31 bushels 23 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur | 50 | .. | 7. Bright | 46 | .. |
| 2. Pearl | 50 | .. | 8. Chancellor | 45 | 20 |
| 3. Gregory | 48 | 40 | 9. Fergus | 45 | 20 |
| 4. Victoria | 48 | .. | 10. Elliot | 44 | 40 |
| 5. Pride | 46 | 40 | 11. Agnes | 44 | 40 |
| 6. Elder | 46 | 40 | 12. Crown | 44 | .. |

An average crop of 46 bushels 40 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Bush. Per acre. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Paragon | 43 | .. | 7. Mummy | 39 | 40 |
| 2. Gregory | 42 | 30 | 8. King | 38 | 50 |
| 3. Macoun | 41 | 40 | 9. German White | 38 | 40 |
| 4. Picton | 41 | 20 | 10. Crown | 38 | 40 |
| 5. Victoria | 41 | 20 | 11. Elliot | 38 | 10 |
| 6. New Potter | 41 | 20 | 12. Prince | 38 | .. |

An average crop of 40 bushels 18 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Bush. Per acre. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Oddfellow | 66 | .. | 7. White Wonder | 57 | .. |
| 2. Pride | 60 | 20 | 8. King | 56 | .. |
| 3. German White | 60 | .. | 9. Fenton | 54 | 40 |
| 4. Paragon | 59 | 40 | 10. Crown | 54 | 20 |
| 5. Daniel O'Rourke | 59 | .. | 11. Agnes | 53 | 40 |
| 6. Gregory | 58 | 40 | 12. Golden Vine | 53 | 20 |

An average crop of 57 bushels 43 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. English Grey | 64 | .. | 7. Mackay | 58 | 50 |
| 2. Harrison's Glory | 60 | 40 | 8. Arthur | 57 | 50 |
| 3. Duke | 60 | .. | 9. New Potter | 57 | 20 |
| 4. Early Britain | 59 | 20 | 10. Elephant Blue | 57 | .. |
| 5. Pride | 59 | 20 | 11. Agnes | 56 | 50 |
| 6. Fergus | 59 | .. | 12. Perth | 56 | .. |

An average crop of 58 bushels 51 lbs. per acre.

The twelve varieties of pease which have given the largest crops in 1901, taking the average results obtained on all the experimental farms, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Gregory.... | 45 | 54 | 7. Agnes.. | 42 | 52 |
| 2. Pride.... | 45 | 36 | 8. Crown.. | 42 | 44 |
| 3. Paragon.... | 45 | 32 | 9. Early Britain... | 42 | 40 |
| 4. New Potter... | 43 | 40 | 10. King.... | 42 | 34 |
| 5. Arthur.. | 43 | 36 | 11. Picton.. | 42 | 34 |
| 6. Nelson.. | 43 | 10 | 12. Victoria.. | 42 | 20 |

An average crop of 43 bushels 36 lbs. per acre.

The average crop of all the varieties of pease tested at each of the experimental farms in 1901 was as follows :—At Ottawa, 27 bushels per acre ; Nappan, 41 bushels ; Brandon, 33 bushels 53 lbs.; Indian Head, 50 bushels 4 lbs., and at Agassiz, 49 bushels 57 lbs. The average return given by the whole of the varieties at all the farms was 40 bushels 23 lbs. per acre.

## TRIAL PLOTS OF INDIAN CORN.

The number of varieties of Indian corn which have been tested in 1901 is thirty-four. These were planted in rows three feet apart and the plants thinned out to six or eight inches apart in the rows. The dates of planting were as follows :—At Ottawa, May 28 ; Nappan, June 3 ; Brandon, May 29 ; Indian Head, May 22, and at Agassiz, May 20 and 21.

All the corn was cut green and put into the silo for the winter feeding of stock. The dates of cutting were :—At Ottawa, September 18 ; Nappan, September 27 ; Brandon, September 5 ; Indian Head, September 2, and at Agassiz, October 14. The yield per acre has been calculated in each case from the weight obtained from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF INDIAN CORN.

| Number. | Name of Variety. | Yield per Acre at the several Experimental Farms, Season of 1901. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N. S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B. C. | | Average of all Farms. | |
| | | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. | Per acre. Tons. | Lbs. |
| 1 | Superior Fodder.... ............... | 24 | 840 | 13 | 620 | 19 | 940 | 23 | 860 | 15 | 1,570 | 19 | 558 |
| 2 | Early Mastodon........... ....... | 24 | 400 | 20 | 150 | 17 | 1,112 | 26 | 1,724 | 20 | 700 | 21 | 1,617 |
| 3 | Early Butler ....................... | 23 | 1,300 | 16 | 1,220 | 17 | 1,376 | 21 | 900 | 15 | 1,460 | 19 | 51 |
| 4 | Rural Thoro'bred White Flint...... | 23 | 200 | 14 | 1,700 | 23 | 860 | 20 | 524 | 22 | 220 | 20 | 1,501 |
| 5 | Extra Early Huron................ | 22 | 1,760 | 14 | 1,370 | 19 | 1,600 | 19 | 544 | 15 | 800 | 18 | 815 |
| 6 | Giant Prolific Ensilage............ | 22 | 1,540 | 14 | 1,370 | 18 | 1,752 | 25 | 1,480 | 12 | 1,410 | 18 | 1,910 |
| 7 | Cloud's Early Yellow... ........... | 22 | 1,540 | 19 | 1,600 | 18 | 300 | 24 | 388 | 12 | 1,520 | 19 | 1,070 |
| 8 | Selected Leaming......... ..... . | 22 | ..... | 17 | 100 | 18 | 1,752 | 23 | 200 | 17 | 540 | 19 | 1,318 |
| 9 | Red Cob Ensilage.................. | 22 | ..... | 14 | 1,700 | 19 | 1,600 | 22 | 180 | 16 | 1,770 | 19 | 250 |
| 10 | Evergreen Sugar.... . ............ | 21 | 1,120 | 13 | 1,500 | 18 | 1,092 | 23 | 1,784 | 11 | 1,430 | 17 | 1,785 |
| 11 | Champion White Pearl ............ | 21 | 460 | 17 | 320 | 18 | 1,356 | 19 | 1,600 | 16 | 1,440 | 18 | 1,435 |
| 12 | Country Gentleman.... ........... | 20 | 1,360 | 12 | 1,850 | 16 | 1,660 | 22 | 1,850 | 9 | 150 | 16 | 974 |
| 13 | Sanford ......... ................ | 19 | 1,820 | 14 | 270 | 20 | 920 | 16 | 500 | 13 | 1,060 | 16 | 1,714 |
| 14 | Salzer's All Gold................... | 19 | 1,380 | 14 | 50 | 23 | 464 | 24 | 180 | 17 | 210 | 19 | 1,257 |
| 15 | Mammoth Cuban..... ............ | 19 | 940 | 17 | 650 | 19 | 280 | 24 | 388 | 17 | 320 | 19 | 512 |
| 16 | Canada White Flint............... | 18 | 1,840 | 13 | 400 | 16 | 1,660 | 22 | 220 | 11 | 1,860 | 16 | 1,196 |
| 17 | Pride of the North.................. | 18 | 1,820 | 15 | 1,800 | 20 | 656 | 26 | 800 | 16 | 1,000 | 19 | 1,215 |
| 18 | Compton's Early........... ....... | 18 | 1,620 | 14 | 50 | 17 | 980 | 19 | 1,996 | 19 | 1,820 | 18 | 93 |
| 19 | White Cap Yellow Dent........... | 18 | 1,300 | 13 | 400 | 18 | 1,224 | 20 | 920 | 20 | 1,250 | 18 | 619 |
| 20 | King of the Earliest . .. .......... | 18 | 80 | 14 | 50 | 18 | 564 | 16 | 200 | 16 | 1,660 | 16 | 1,311 |
| 21 | Mamm. Eight rowed Flint......... | 17 | 1,420 | 13 | 620 | 19 | 1,732 | 20 | 1,844 | 22 | 1,320 | 18 | 1,787 |
| 22 | Black Mexican..... ............. | 16 | 1,660 | 13 | 1,720 | 18 | 168 | 17 | 640 | 7 | 520 | 14 | 1,342 |
| 23 | Early Yellow Long Eared.......... | 16 | 1,220 | 16 | 1,000 | 21 | 1,956 | 17 | 452 | 13 | 1,280 | 17 | 382 |
| 24 | Longfellow......................... | 15 | 360 | 15 | 250 | 19 | 1,204 | 21 | 1,560 | 15 | 1,900 | 17 | 1,055 |
| 25 | North Dakota White.............. | 14 | 1,700 | 12 | 750 | 20 | 1,448 | 21 | 504 | 15 | 360 | 16 | 1,752 |
| 26 | Angel of Midnight................. | 14 | 1,480 | 14 | 1,370 | 15 | 1,152 | 22 | 1,408 | 10 | 1,890 | 15 | 1,460 |
| 27 | Pearce's Prolific.................... | 14 | 1,260 | 12 | 750 | 20 | 1,184 | 23 | 1,520 | 10 | 20 | 16 | 547 |
| 28 | North Dakota Yellow.............. | 14 | 1,040 | 13 | 950 | 17 | 1,904 | 17 | 1,738 | 9 | 1,800 | 14 | 1,488 |
| 29 | Kendall's Early Giant ............. | 13 | 1,280 | 13 | 95[illegible] | 17 | 452 | 17 | 188 | 13 | 1,610 | 15 | 94 |
| 30 | Early August......... ............ | 10 | 240 | 9 | 1,8[illegible]0 | * | ..... | 19 | 558 | 5 | 1,120 | 11 | 179 |
| 31 | Salzer's Earliest Ripe.............. | 9 | 700 | 10 | 900 | 11 | 1,364 | 12 | 1,080 | 5 | 1,440 | 9 | 1,897 |
| 32 | Extra Early Szekely................ | 9 | 260 | 8 | 1,600 | 11 | 704 | 13 | 1,[illegible]4 | .. | ** | 10 | 1,472 |
| 33 | Yellow Six-weeks............ ... . | 9 | 40 | 10 | 550 | 11 | 176 | 19 | 1,[illegible] | 5 | 560 | 11 | 238 |
| 34 | Mitchell's Early.................... | 8 | 1,600 | 9 | 370 | 14 | 512 | 12 | 1,244 | 5 | 450 | 10 | 35 |

*Seed not received at Brandon.

**Did not germinate well at Agassiz.

The six varieties of Indian corn which have given the heaviest crops at the several experimental farms during 1901, are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Superior Fodder.... .. .. .. .. .. | 24 | 840 | 4. Pural Thoro'bred White Flint.. | 23 | 200 |
| 2. Early Mastodon.... .. .. .. .. .. | 24 | 400 | 5. xtra Early Huron.. .. .. .. .. | 22 | 1,760 |
| 3. Early Butler.. .. .. .. .. .. .. .. | 23 | 1,300 | 6. G.ant Prolific Ensilage.. .. .. .. | 22 | 1,540 |

An average crop of 23 tons 1,007 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Mastodon.. .. .. .. .. .. .. | 20 | 150 | 4. Pride of the North... .. .. .. .. | 17 | 650 |
| 2. Cloud's Early Yellow.... .. .. .. | 19 | 1,600 | 5. Champion White Pearl.... .. .. | 17 | 320 |
| 3. Mammoth Cuban... .. .. .. .. .. | 17 | 650 | 6. Selected Leaming.... .. .. .. .. | 17 | 100 |

An average crop of 18 tons 245 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Rural Thoro'bred White Flint... | 23 | 860 | 4. North Dakota White.... .. .. .. | 20 | 1,448 |
| 2 Salzer's All Gold... .. .. .. .. .. | 23 | 464 | 5. Pearce's Prolific... .. .. .. .. .. | 20 | 1,184 |
| 3. Early Yellow Long-eared... .. .. | 21 | 1,956 | 6. Sanford.... .. .. .. .. .. .. .. .. | 20 | 920 |

An average crop of 21 tons 1,472 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Mastodon.. .. .. .. .. .. .. | 26 | 1,724 | 4. Cloud's Early Yellow.... .. .. .. | 24 | 388 |
| 2. Pride of the North.... .. .. .. .. | 26 | 800 | 5. Mammoth Cuban.. .. .. .. .. .. | 24 | 388 |
| 3. Giant Prolific Ensilage.. .. .. .. | 25 | 1,480 | 6. Salzer's All Gold.. .. .. .. .. .. | 24 | 180 |

An average crop of 25 tons 493 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage.. .. .. .. .. .. | 16 | 1,770 | 4. Cloud's Early Yellow.... .. .. .. | 12 | 1,520 |
| 2. Early Yellow Long-eared... .. .. | 13 | 1,280 | 5. Giant Prolific Ensilage.. .. .. .. | 12 | 1,410 |
| 3. Sanford.. .. .. .. .. .. .. .. .. .. | 13 | 1,060 | 6. Canada White Flint.. .. .. .. .. | 11 | 1,860 |

An average crop of 13 tons 1,150 lbs. per acre.

The six varieties of Indian corn which have given the heaviest crops in 1901, taking the average of the results obtained on all the experimental farms, are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Early Mastodon.... .. .. .. .. .. | 21 | 1,617 | 4. Salzer's All Gold.. .. .. .. .. .. | 19 | 1,257 |
| 2. Rural Thoro'bred White Flint.... | 20 | 1,501 | 5. Pride of the North... .. .. .. .. | 19 | 1,215 |
| 3. Selected Leaming.. .. .. .. .. .. | 19 | 1,318 | 6. Cloud's Early Yellow.... .. .. .. | 19 | 1,070 |

An average crop of 20 tons 330 lbs. per acre.

The average weight cut green of all the varieties of Indian corn tested at each of the experimental farms in 1901 was as follows :—At Ottawa, 17 tons 1,811 lbs. per acre ; Nappan, 14 tons 199 lbs.; Brandon, 18 tons 488 lbs.; Indian Head, 20 tons 1,211 lbs.; and at Agassiz, 13 tons 1,953 lbs. The average return given by the whole of the varieties at all the farms was 16 tons 1,932 lbs. per acre.

## TRIAL PLOTS OF TURNIPS.

Twenty-nine varieties of turnips were tested during 1901, sown on drills or on the flat 2½ feet apart. Two sowings were made at each farm, the second sowing about two weeks later than the first. The dates of sowing will be found in the accompanying table, the dates on which the roots were pulled were as follows :—At Ottawa, October 14 ; Nappan, October, 30 ; Brandon, October 10 ; Indian Head, October 11, and at Agassiz, November 11. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF TURNIPS.

| Number. | Name of Variety. | Ottawa, Ont. Sown May 8. | Ottawa, Ont. Sown May 22. | Nappan, N.S. Sown May 27. | Nappan, N.S. Sown June 10. | Brandon, Man. Sown May 16. | Brandon, Man. Sown May 30. | Indian Head, N.W.T. Sown May 21. | Indian Head, N.W.T. Sown May 29. | Agassiz, B.C. Sown May 28. | Agassiz, B.C. Sown June 11. | Average of all Farms. First Sowing. | Average of all Farms. Second Sowing. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. | Per acre, Tons. Lbs. |
| 1 | Carter's Elephant | 41 1,820 | 29 80 | 42 150 | 23 200 | 24 312 | 9 1,800 | 22 352 | 14 1,436 | 42 1,305 | 42 480 | 34 1,188 | 23 1,399 |
| 2 | Hartley's Bronze | 41 1,490 | 29 80 | 44 1,100 | 28 925 | 30 1,512 | 15 1,680 | 30 1,116 | 21 1,560 | 40 520 | 35 950 | 37 1,148 | 26 239 |
| 3 | Drummond Purple Top | 40 520 | 28 760 | 29 1,400 | 26 1,625 | 19 280 | 6 1,200 | 21 360 | 15 1,680 | 43 1,120 | 38 230 | 30 1,536 | 23 299 |
| 4 | Halewood's Bronze Top | 39 1,530 | 28 430 | 33 1,650 | 26 800 | 22 616 | 13 1,720 | 31 436 | 15 1,896 | 35 1,128 | 38 1,055 | 32 1,072 | 24 1,180 |
| 5 | Hall's Westbury | 37 1,240 | 27 1,110 | 31 1,525 | 25 1,150 | 31 1,624 | 16 1,792 | 32 548 | 24 840 | 45 420 | 42 1,470 | 35 1,471 | 27 872 |
| 6 | Sutton's Champion | 37 1,240 | 28 1,090 | 28 1,750 | 21 75 | 26 272 | 13 400 | 34 1,696 | 27 1,308 | 43 295 | 40 850 | 34 251 | 26 345 |
| 7 | Bangholm Selected | 36 1,590 | 25 1,480 | 35 950 | 24 1,500 | 23 1,784 | 13 1,984 | 22 1,804 | 27 1,532 | 38 1,220 | 42 1,140 | 31 1,069 | 26 1,927 |
| 8 | Emperor Swede | 36 270 | 32 1,670 | 31 700 | 29 1,400 | 15 1,944 | 12 1,080 | 28 1,948 | 22 1,540 | 49 10 | 48 30 | 32 574 | 29 344 |
| 9 | Champion Purple Top | 34 1,300 | 27 450 | 28 1,750 | 18 1,125 | 14 1,568 | 13 1,984 | 25 1,744 | 20 1,848 | 40 350 | 39 530 | 28 1,742 | 23 1,987 |
| 10 | Prize Purple Top | 34 310 | 23 1,520 | 34 475 | 28 1,750 | 26 1,064 | 14 1,040 | 30 192 | 36 72 | 46 70 | 38 1,385 | 34 422 | 28 753 |
| 11 | Magnum Bonum | 33 1,650 | 24 1,830 | 28 1,750 | 19 1,600 | 26 8 | 12 1,872 | 33 ...... | 28 1,156 | 48 1,020 | 38 1,220 | 31 86 | 24 1,955 |
| 12 | Marquis of Lorne | 33 1,320 | 27 120 | 33 1,650 | 25 1,975 | 19 1,864 | 11 176 | 23 992 | 23 1,124 | 44 440 | 34 1,630 | 31 53 | 24 1,005 |
| 13 | New Arctic | 33 990 | 21 240 | 41 500 | 32 350 | 26 536 | 11 1,760 | 20 1,976 | 25 1,480 | 43 1,935 | 41 1,820 | 33 387 | 26 1,130 |
| 14 | Selected Purple Top | 33 330 | 28 1,750 | 34 475 | 24 1,500 | 17 1,640 | 11 176 | 37 1,900 | 26 140 | 39 1,530 | 35 290 | 32 1,175 | 25 371 |
| 15 | Skirvings | 32 1,340 | 27 1,110 | 30 225 | 22 1,375 | 23 464 | 14 1,040 | 28 1,288 | 27 120 | 43 1,450 | 40 1,180 | 31 1,353 | 26 965 |
| 16 | West Norfolk Red Top | 32 1,340 | 26 800 | 30 1,875 | 29 1,400 | 20 920 | 11 1,760 | 28 496 | 20 1,976 | 37 1,570 | 29 1,730 | 30 40 | 23 1,533 |
| 17 | Imperial Swede | 32 1,340 | 22 880 | 40 850 | 25 325 | 25 1,744 | 14 776 | 28 232 | 26 536 | 47 380 | 42 1,140 | 34 1,709 | 26 331 |
| 18 | Selected Champion | 32 1,010 | 25 1,150 | 36 1,425 | 30 225 | 17 1,640 | 12 1,872 | 33 ..... | 25 952 | 41 800 | 35 620 | 32 575 | 25 1,764 |
| 19 | Shamrock Purple Top | 32 20 | 26 1,790 | 33 1,650 | 28 1,750 | 23 200 | 15 1,944 | 34 1,300 | 29 1,796 | 38 890 | 37 1,900 | 32 812 | 27 1,836 |
| 20 | Elephant's Master | 31 1,690 | 20 1,580 | 30 1,875 | 20 1,250 | 24 1,368 | 10 328 | 29 344 | 24 1,500 | 44 770 | 35 600 | 32 409 | 22 651 |
| 21 | Giant King | 31 1,360 | 26 1,460 | 35 950 | 22 550 | 21 1,296 | 7 1,312 | 25 160 | 16 1,132 | 40 1,180 | 35 620 | 30 1,789 | 21 1,415 |
| 22 | Prize Winner | 30 1,380 | 26 140 | 28 700 | 20 1,250 | 30 720 | 17 320 | 33 1,452 | 26 932 | 43 460 | 42 1,140 | 33 543 | 26 1,156 |
| 23 | East Lothian | 30 720 | 27 1,440 | 31 700 | 22 1,375 | 24 576 | 12 552 | 24 972 | 20 1,316 | 46 1,720 | 39 540 | 31 938 | 24 1,045 |
| 24 | Perfection Swede | 30 60 | 29 1,070 | 37 1,900 | 30 1,875 | 24 312 | 16 1,264 | 39 144 | 32 944 | 38 1,055 | 38 230 | 33 1,894 | 29 1,077 |
| 25 | Kangaroo | 27 120 | 22 1,870 | 33 1,650 | 24 1,500 | 25 424 | 9 1,536 | 28 760 | 24 1,632 | 40 1,860 | 45 1,080 | 31 163 | 25 1,123 |
| 26 | Monarch | 25 490 | 22 880 | 33 1,650 | 24 675 | 21 1,560 | 13 400 | 41 104 | 28 364 | 45 172 | 42 1,140 | 33 795 | 26 292 |
| 27 | Mammoth Clyde | 24 180 | 22 550 | 37 1,075 | 34 1,500 | 27 1,704 | 15 360 | 25 688 | 24 576 | 41 1,820 | 39 540 | 31 693 | 27 305 |
| 28 | Jumbo | 23 1,850 | 20 590 | 37 250 | 36 800 | 22 1,408 | 8 1,160 | 23 1,256 | 19 280 | 45 255 | 38 1,220 | 30 1,004 | 24 1,210 |
| 29 | **Webb's New Renown** | 16 670 | 17 1,970 | 38 | 26 1,625 | * | * | 35 1,808 | 30 1,908 | 34 1,960 | 38 65 | 30 109 | 28 892 |

*This variety at Brandon was destroyed by rot.

The crops of the two sowings of turnips at the experimental farms in 1901 have averaged per acre as follows :—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm, first sowing.... ...... | 32 | 1,420 |
| " " second sowing.. ...... | 25 | 1,582 |
| Experimental Farm, Nappan, first sowing.. ........ | 34 | 297 |
| " " second sowing.. ...... | 26 | 188 |
| " Brandon, first sowing.. ...... | 23 | 1,049 |
| " " second sowing ... .... | 12 | 1,617 |
| " Indian Head, first sowing.. .... | 29 | 899 |
| " " second sowing .... | 24 | 951 |
| " Agassiz, first sowing.. ........ | 42 | 886 |
| " " second sowing ...... | 39 | 442 |

Average crop from all the plots at all the farms, first sowing, 32 tons 910 lbs.; second sowing, 25 tons 1,356 lbs., showing an advantage in favour of the first sowing of 6 tons 1,554 lbs. per acre. It will be seen that the early sown plots have given the larger crops at all the experimental farms.

The six varieties of turnips which have given the heaviest crop at the several experimental farms during the season of 1901 are the following. (Where not otherwise stated the quantities given are all from the early sown plots) :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Carter's Elephant.. ........ | 41 | 1,820 | 4. Halewood's Bronze Top.... .... | 39 | 1,530 |
| 2. Hartley's Bronze... ........ | 41 | 1,490 | 5. Hall's Westbury.. ........ | 37 | 1,240 |
| 3. Drummond Purple Top... ...... | 40 | 520 | 6. Sutton's Champion... ........ | 37 | 1,240 |

An average crop of 39 tons 1,640 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze... ........ | 44 | 1,100 | 4. Imperial Swede.... ........ | 40 | 850 |
| 2. Carter's Elephant.. ........ | 42 | 150 | 5. Perfection Swede.. ........ | 37 | 1,900 |
| 3. New Arctic.... ........... | 41 | 500 | 6. Mammoth Clyde... ........ | 37 | 1,075 |

An average crop of 40 tons 1,262 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hall's Westbury.... ........ | 31 | 1,624 | 4. Mammoth Clyde.. ........ | 27 | 1,704 |
| 2. Hartley's Bronze... ........ | 30 | 1,512 | 5. Prize Purple Top.. ........ | 26 | 1,064 |
| 3. Prize Winner.... ........ | 30 | 720 | 6. New Arctic.. ........... | 26 | 536 |

An average crop of 28 tons 1,860 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Monarch | 41 | 104 | 4. Prize Purple Top (second sowing) | 36 | 72 |
| 2. Perfection Swede | 39 | 144 | 5. Webb's New Renown | 35 | 1,808 |
| 3. Selected Purple Top | 37 | 1,900 | 6. Sutton's Champion | 34 | 1,696 |

An average crop of 37 tons 954 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Emperor Swede | 49 | 10 | 4. East Lothian | 46 | 1,720 |
| 2. Magnum Bonum | 48 | 1,020 | 5. Prize Purple Top | 46 | 70 |
| 3. Imperial Swede | 47 | 380 | 6. Kangaroo (second sowing) | 45 | 1,080 |

An average crop of 47 tons 380 lbs. per acre.

The six varieties of turnips which have produced the heaviest crops in 1901, taking the average of the results obtained on all the experimental farms, are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze | 37 | 1,148 | 4. Carter's Elephant | 34 | 1,188 |
| 2. Hall's Westbury | 35 | 1,471 | 5. Prize Purple Top | 34 | 422 |
| 3. Imperial Swede | 34 | 1,709 | 6. Sutton's Champion | 34 | 251 |

An average crop of 35 tons 365 lbs. per acre.

## TRIAL PLOTS OF MANGELS.

Twenty-five varieties of mangels have been under test during 1901, all sown on drills or on the flat in rows 2½ feet apart. Two sowings were made at each farm, the second sowing about two weeks later than the first. The dates of sowing will be found in the accompanying table ; the dates on which the roots were pulled were as follows :—At Ottawa, October 14 ; Nappan, October 17 ; Brandon, September 24 ; Indian Head, October 1, and at Agassiz, November 6. The yield per acre has been calculated in each case from the weight of roots gathered from two rows, each 66 feet long.

# UNIFORM TEST PLOTS OF MANGELS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N. W. T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | Sown May 22. | Sown May 27. | Sown June 10. | Sown May 16. | Sown May 30. | Sown May 22. | Sown May 29. | Sown April 26. | Sown May 10. | First Sowing. | Second Sowing. |
| | | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Pons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. | Per acre. Tons. lbs. |
| 1 | Champion Yellow Globe... | 45 1,080 | 28 430 | 32 1,340 | 31 1,525 | 18 1,488 | 15 360 | 23 1,520 | 22 1,804 | 20 95 | 19 280 | 28 305 | 23 880 |
| 2 | Mam. Yellow Intermediate. | 44 1,100 | 28 1,750 | 33 .... | 37 250 | 25 160 | 13 400 | 26 1,328 | 22 880 | 24 840 | 21 570 | 30 1,486 | 24 1,170 |
| 3 | Yellow Intermediate...... | 44 110 | 32 350 | 30 1,875 | 31 700 | 34 1,168 | 13 1,720 | 23 728 | 25 1,612 | 21 1,065 | 19 610 | 30 1,789 | 24 998 |
| 4 | Giant Yellow Intermediate | 43 790 | 30 1,380 | 27 1,440 | 31 1,525 | 34 640 | 13 928 | 25 952 | 22 1,936 | 26 120 | 23 530 | 31 788 | 24 859 |
| 5 | Prize Winner Yellow Globe | 42 1,800 | 34 1,630 | 27 1,275 | 27 1,275 | 15 1,680 | 32 1,208 | 27 1,208 | 29 80 | 20 460 | 14 1,865 | 26 1,685 | 27 1,612 |
| 6 | Norbiton Giant.......... | 42 1,470 | 27 450 | 32 350 | 32 1,175 | 35 488 | 20 128 | 24 972 | 21 504 | 19 1,600 | 17 1,640 | 30 1,776 | 23 1,579 |
| 7 | Half Long Sugar Rosy.... | 42 480 | 27 450 | 35 1,775 | 30 225 | 32 680 | 21 1,368 | 27 780 | 24 180 | 15 360 | 14 1,700 | 30 1,215 | 22 385 |
| 8 | Giant Yellow Half Long... | 42 480 | 34 1,300 | 29 400 | 30 1,875 | 21 240 | 18 960 | 26 308 | 24 576 | 16 1,085 | 17 1,475 | 27 103 | 25 437 |
| 9 | Gate Post.............. | 41 830 | 35 290 | 39 1,200 | 32 1,175 | 29 1,136 | 28 1,552 | 24 972 | 17 1,910 | 16 1,165 | 17 1,640 | 30 661 | 26 919 |
| 10 | Giant Yellow Globe...... | 41 335 | 31 370 | 35 620 | 33 ... | 36 1,920 | 32 1,472 | 25 28 | 26 992 | 19 280 | 16 670 | 31 1,037 | 27 1,901 |
| 11 | Half Long Sugar White... | 39 1,695 | 30 1,380 | 35 125 | 31 700 | 46 400 | 38 560 | 24 1,368 | 27 384 | 17 1,640 | 15 360 | 32 1,446 | 28 1,077 |
| 12 | Mammoth Long Red...... | 37 1,570 | 27 780 | 28 1,750 | 23 925 | 37 1,768 | 29 80 | 21 1,824 | 19 1,336 | 16 1,660 | 16 1,990 | 28 1,314 | 24 622 |
| 13 | Warden Orange Globe..... | 37 910 | 28 760 | 34 1,795 | 31 205 | 28 232 | 17 1,904 | 19 16 | 24 708 | 20 920 | 19 940 | 27 1,975 | 24 503 |
| 14 | Golden Fleshed Tankard.. | 36 1,590 | 24 675 | 28 1,750 | 36 1,755 | 18 432 | 25 1,480 | 19 940 | 22 1,012 | 13 730 | 17 980 | 23 688 | 25 780 |
| 15 | Leviathan Long Red...... | 36 1,260 | 30 1,380 | 29 400 | 30 1,875 | 26 800 | 21 240 | 23 1,124 | 17 1,640 | 16 835 | 15 690 | 26 884 | 23 365 |
| 16 | Prize Mamm. Long Red... | 36 270 | 32 20 | 29 1,895 | 29 575 | 31 1,360 | 24 576 | 30 1,380 | 29 740 | 17 320 | 16 1,000 | 29 245 | 26 582 |
| 17 | Lion Yellow Intermediate.. | 38 1,280 | 31 1,360 | 29 1,895 | 33 825 | 24 1,104 | 29 920 | 27 912 | 27 1,572 | 22 1,090 | 20 95 | 28 1,238 | 26 1,354 |
| 18 | Gate Post Yellow......... | 34 1,960 | 30 60 | 29 400 | 31 1,205 | 24 1,896 | 33 1,848 | 20 1,448 | 18 960 | 15 1,020 | 13 400 | 25 145 | 25 895 |
| 19 | Mammoth Oval Shaped.... | 34 640 | 26 1,460 | 31 1,525 | 31 1,195 | 28 760 | 19 1,600 | 23 332 | 28 1,552 | 19 775 | 21 590 | 27 806 | 25 1,279 |
| 20 | Selected Mamm. Long Red | 34 640 | 28 1,420 | 28 760 | 28 100 | 37 1,240 | 26 272 | 26 1,856 | 28 1,816 | 19 1,435 | 21 240 | 29 786 | 26 1,170 |
| 21 | Ward's Large Oval Shaped. | 34 310 | 22 1,540 | 31 700 | 25 125 | 27 384 | 22 88 | 29 740 | 21 1,560 | 9 480 | 11 1,430 | 26 523 | 20 1,549 |
| 22 | Red Fleshed Tankard...... | 33 1,320 | 26 510 | 33 1,650 | 25 1,975 | 12 24 | 11 440 | 10 1,648 | 8 236 | * | * | 22 1,161 | 17 1,790 |
| 23 | Triumph Yellow Globe... | 33 990 | 25 490 | 25 325 | 31 1,525 | 29 1,400 | 26 8 | 25 1,292 | 24 444 | 16 340 | 17 320 | 26 69 | 24 1,757 |
| 24 | Canadian Giant........... | 30 225 | 30 60 | 34 1,300 | 31 700 | 21 504 | 34 640 | 28 1,948 | 18 168 | 12 1,740 | 16 1,330 | 25 1,143 | 26 180 |
| 25 | Yellow Fleshed Tankard.. | 29 1,070 | 24 1,830 | 37 1,075 | 28 100 | 19 1,600 | 19 1,864 | 22 1,672 | 19 1,864 | 19 1,930 | 17 320 | 25 1,869 | 21 1,996 |

The crops from the two sowings of mangels at the experimental farms in 1901 have averaged per acre as follows:—

| | Tons. | Lbs. |
|---|---|---|
| Central Experimental Farm first sowing.................... | 38 | 648 |
| " " " second sowing.................. | 29 | 405 |
| Experimental Farm Nappan first sowing.................... | 31 | 1,425 |
| " " " second sowing.................. | 30 | 1,900 |
| " " Brandon first sowing.................. | 27 | 1,820 |
| " " " second sowing .. ........ .... | 23 | 665 |
| Experimental Farm Indian Head, first sowing.............. | 24 | 772 |
| " " " " second sowing.... ........ | 22 | 1,940 |
| " " Agassiz, first sowing.................. | 18 | 412 |
| " " " second sowing.............. | 17 | 1,153 |

* Failed entirely.

Average crop from all the plots, at all the farms: first sowing 28 tons 215 lbs.; second sowing 24 tons 1613 lbs. showing an advantage in favour of early sowing of 3 tons 602 lbs. per acre.

The early sown mangels have given larger crops at all of the experimental farms.

The six varieties of mangels which have produced the heaviest crops at the several experimental farms during 1901 are the following. (Unless otherwise stated, the yields given are all from the earliest sown plots) :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Champion Yellow Globe.. .. .. .. | 45 | 1,080 | 4. Giant Yellow Intermediate... .. | 43 | 790 |
| 2. Mammoth Yellow Intermediate... | 44 | 1,110 | 5. Prize Winner Yellow Globe... .. | 42 | 1,800 |
| 3. Yellow Intermediate.. .. .. .. .. | 44 | 110 | 6. Norbiton Giant.... .. .. .. .. .. | 42 | 1,470 |

An average crop of 43 tons 1,727 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Gate Post.. .. .. .. .. .. .. .. .. .. | 39 | 1,200 | 4. Yellow Fleshed Tankard... .. .. | 36 | 1,755 |
| 2. Golden Fleshed Tankard.... .. .. | 37 | 1,075 | 5. Half Long Sugar Rosy.. .. .. .. | 35 | 1,775 |
| 3. Mamm. Yellow Intermediate (2nd sowing).. .. .. .. .. .. .. .. .. .. | 37 | 250 | 6. Giant Yellow Globe.. .. .. .. .. | 35 | 620 |

An average crop of 37 tons 112 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long Sugar White.. .. .. .. | 46 | 400 | 4. Giant Yellow Globe.. .. .. .. .. | 36 | 1,920 |
| 2. Mammoth Long Red... .. .. .. .. | 37 | 1,768 | 5. Norbiton Giant.. .. .. .. .. .. .. | 35 | 488 |
| 3. Selected Mammoth Long Red.. .. | 37 | 1,240 | 6. Yellow Intermediate.... .. .. .. | 34 | 1,168 |

An average crop of 38 tons 164 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Prize Mammoth Long Red.. .. .. | 30 | 1,380 | 4. Canadian Giant.... .. .. .. .. .. | 28 | 1,948 |
| 2. Ward's Long Oval-shaped.. .. .. | 29 | 740 | 5. Selected Mammoth Long Red (2nd sowing).. .. .. .. .. .. .. | 28 | 1,816 |
| 3. Prize Winner Yellow Globe (2nd sowing).. .. .. .. .. .. .. .. .. .. | 29 | 80 | 6. Mammoth Oval-shaped.. .. .. .. | 28 | 1,552 |

An average crop of 29 tons 586 lbs per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant Yellow Intermediate ... .. | 26 | 120 | 4. Yellow Intermediate.... .. .. .. | 21 | 1,065 |
| 2. Mammoth Yellow Intermediate.... | 24 | 840 | 5. Mammoth Oval-shaped (2nd sowing).. .. .. .. .. .. .. .. .. .. | 21 | 590 |
| 3. Lion Yellow Intermediate.. .. .. | 22 | 1,000 | 6. Selected Mammoth Long Red... | 21 | 240 |

An average crop of 22 tons 1,642 lbs. per acre.

The six varieties of mangels which have produced the heaviest crops in 1901, taking the average of the results obtained on all the experimental farms, are :

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long Sugar White.. .. .. .. .. | 32 | 1,446 | 4. Yellow Intermediate.... .. .. .. .. | 30 | 1,789 |
| 2. Giant Yellow Globe. .. .. .. .. .. .. | 31 | 1,037 | 5. Norbiton Giant.... .. .. .. .. .. .. | 30 | 1,776 |
| 3. Giant Yellow Intermediate.... .. | 31 | 788 | 6. Mammoth Yellow Intermediate.. | 30 | 1,486 |

An average crop of 31 tons 720 lbs. per acre.

## TRIAL PLOTS OF CARROTS.

Twenty different sorts of carrots were tested during 1901, all sown on drills or on the flat in rows two feet apart. Two sowings were made in each case, the second sowing two weeks later than the first. The dates of sowing will be found in the accompanying table ; the dates on which the carrots were pulled were as follows :—At Ottawa, October 14 ; Nappan, October 30 ; Brandon, October 12 ; Indian Head, October 12, and at Agassiz, November 5. The yield per acre in each case has been calculated from the weight of roots gathered from two rows, each 66 feet long.

# UNIFORM TEST PLOTS OF CARROTS.

| Number. | Name of Variety. | Ottawa, Ont. Sown May 8. | Ottawa, Ont. Sown May 22. | Nappan, N. S. Sown May 27. | Nappan, N. S. Sown June 10. | Brandon, Man. Sown May 16. | Brandon, Man. Sown May 30. | Indian Head, N.W.T. Sown May 21. | Indian Head, N.W.T. Sown May 29. | Agassiz, B.C. Sown April 25. | Agassiz, B.C. Sown May 9. | Average of all Farms. First Sowing. | Average of all Farms. Second Sowing. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Half Long White.......... | 43 790 | 27 1,440 | 21 1,725 | 20 425 | 20 480 | 15 800 | 12 1,344 | 6 1,860 | 25 490 | 28 1,585 | 26 523 | 20 1,549 |
| 2 | New White Intermediate.... | 42 1,140 | 31 1,030 | 28 100 | 21 900 | 19 1,600 | 12 640 | 12 1,608 | 11 1,760 | 25 1,263 | 26 140 | 25 1,542 | 20 1,294 |
| 3 | Mamm. White Intermediate. | 40 1,510 | 36 1,260 | 29 1,400 | 17 1,475 | 11 880 | 17 1,200 | 12 420 | 6 1,728 | 27 1,110 | 25 1,974 | 24 665 | 20 1,927 |
| 4 | Giant White Vosges......... | 38 890 | 30 1,050 | 31 700 | 21 900 | 21 240 | 12 1,080 | 8 1,744 | 8 1,952 | 28 1,585 | 28 740 | 25 1,432 | 20 744 |
| 5 | Iverson's Champion......... | 37 580 | 29 1,400 | 21 1,725 | 20 1,250 | 14 1,920 | 14 600 | 12 1,212 | 10 592 | 30 720 | 30 390 | 23 831 | 21 46 |
| 6 | Half Long Chantenay...... | 37 250 | 23 1,190 | 23 1,025 | 19 1,600 | 6 320 | 13 1,720 | 12 816 | 8 1,688 | 20 920 | 20 1,580 | 19 1,866 | 17 756 |
| 7 | Ontario Champion........... | 34 1,300 | 34 310 | 30 1,050 | 21 1,725 | 20 480 | 13 840 | 12 1,740 | 11 572 | 28 100 | 26 1,130 | 25 534 | 21 915 |
| 8 | Improved Short White...... | 33 660 | 32 20 | 27 450 | 19 775 | 15 1,680 | 14 1,040 | 11 1,232 | 12 1,080 | 30 1,220 | 25 637 | 23 1,448 | 20 1,510 |
| 9 | Green Top White Orthe..... | 30 1,050 | 22 1,870 | 26 1,295 | 21 900 | 6 760 | 16 1,880 | 11 1,668 | 8 896 | 27 1,440 | 28 1,585 | 20 1,243 | 19 1,426 |
| 10 | Long Yellow Stump rooted.. | 28 1,750 | 23 860 | 24 675 | 19 775 | 14 1,920 | 12 1,520 | 11 968 | 10 1,780 | 23 1,520 | 25 1,314 | 20 1,367 | 18 850 |
| 11 | White Vosges Large Short.. | 24 1,500 | 22 1,870 | 17 1,475 | 14 1,700 | * | 14 1,480 | 12 552 | 10 1,252 | 21 1,230 | 24 1,500 | 18 533 | 17 1,160 |
| 12 | Yellow Intermediate........ | 24 1,540 | 17 980 | 24 1,500 | 20 1,250 | 17 1,640 | 11 880 | 9 1,932 | 8 1,424 | 26 1,046 | 21 240 | 20 1,524 | 15 175 |
| 13 | Carter's Orange Giant...... | 24 840 | 21 240 | 19 775 | 18 525 | 7 140 | 14 1,920 | 9 1,008 | 6 1,728 | 26 1,130 | 26 635 | 17 779 | 17 1,010 |
| 14 | Early Gem................. | 23 530 | 21 240 | 24 1,005 | 16 1,825 | 4 1,240 | 13 840 | 7 1,212 | 7 652 | 26 800 | 21 1,548 | 17 577 | 16 221 |
| 15 | Guerande or Ox-Heart....... | 22 550 | 21 570 | 26 800 | 17 650 | 5 1,880 | 16 1,000 | 9 1,932 | 6 1,200 | 17 1,640 | 18 1,143 | 16 960 | 16 113 |
| 16 | Scarlet Intermediate........ | 21 1,560 | 20 590 | 19 775 | 16 1,825 | 16 1,000 | 8 720 | 9 1,400 | 9 216 | 23 1,468 | 21 240 | 18 441 | 11 318 |
| 17 | White Belgian.............. | 19 610 | 23 530 | 29 1,400 | 19 1,600 | 19 1,600 | 13 1,720 | 12 816 | 11 1,668 | 19 1,765 | 24 1,181 | 20 438 | 18 1,340 |
| 18 | Long Orange or Surrey..... | 17 1,970 | 14 1,370 | 17 1,745 | 16 175 | 9 40 | 8 720 | 5 1,616 | 4 1,504 | 14 1,040 | 13 1,720 | 13 82 | 11 1,098 |
| 19 | Long Scarlet Altringham ... | 16 1,330 | 14 50 | 20 425 | 18 525 | 8 1,600 | 7 80 | 7 784 | 5 448 | 20 590 | 19 1,930 | 14 1,346 | 12 1,807 |
| 20 | Scarlet Nantes............ | 14 710 | 13 730 | 18 300 | 11 1,925 | 10 1,560 | 7 960 | 7 388 | 6 1,464 | 13 1,573 | 13 70 | 12 1,706 | 10 1,030 |

* The seed of this variety was not received early enough for the first sowing.

The crops from the two sowings of carrots at the experimental farms in 1901 have averaged as follows:—

| | | |
|---|---|---|
| Central Experimental Farm, first sowing.................... | 28 tons. | 1,651 lbs. |
| " " second sowing................ | 24 " | 180 " |
| Experimental Farm, Nappan, first sowing.................... | 24 " | 217 " |
| " " second sowing............... | 18 " | 1,436 " |
| " Brandon, first sowing ............... | 13 " | 420 " |
| " " second sowing................ | 12 " | 1,982 " |
| Experimental Farm, Indian Head, first sowing............. | 10 tons. | 1,124 lbs. |
| " " second sowing.......... | 8 " | 1,473 " |
| " " Agassiz, first sowing.................. | 23 " | 1,932 " |
| " " " second sowing.............. | 23 " | 1,164 " |

Average crop from all the plots at all the farms, first sowing, 20 tons 269 lbs., second sowing, 17 tons 1,247 lbs., showing an advantage in favour of the early sown plots of 2 tons 1,022 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops during the season of 1901 are the following. (Unless otherwise stated, the yields given are all from the earliest sown plots) :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|
| 1. Half Long White | 43 | 790 |
| 2. New White Intermediate | 42 | 1,140 |
| 3. Mammoth White Intermediate | 40 | 1,510 |
| 4. Giant White Vosges | 38 | 890 |
| 5. Iverson's Champion | 37 | 580 |
| 6. Half Long Chantenay | 37 | 250 |

An average crop of 39 tons 1,860 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|
| 1. Giant White Vosges | 31 | 700 |
| 2. Ontario Champion | 30 | 1,050 |
| 3. Mammoth White Intermediate | 29 | 1,400 |
| 4. White Belgian | 29 | 1,400 |
| 5. New White Intermediate | 28 | 100 |
| 6. Improved Short White | 27 | 450 |

An average crop of 29 tons 850 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|
| 1. Giant White Vosges | 21 | 240 |
| 2. Half Long White | 20 | 480 |
| 3. Ontario Champion | 20 | 480 |
| 4. White Belgian | 19 | 1,600 |
| 5. New White Intermediate | 19 | 1,600 |
| 6. Yellow Intermediate | 17 | 1,640 |

An average crop of 19 tons 1,673 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|
| 1. Ontario Champion | 12 | 1,740 |
| 2. New White Intermediate | 12 | 1,608 |
| 3. Iverson's Champion | 12 | 1,212 |
| 4. Improved Short White (2nd sowing) | 12 | 1,080 |
| 5. Half Long Chantenay | 12 | 816 |
| 6. White Belgian | 12 | 816 |

An average crop of 12 tons 1,212 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|
| 1 Improved Short White | 30 | 1,220 |
| 2. Iverson's Champion | 30 | 720 |
| 3. Giant White Vosges | 28 | 1,585 |
| 4. Green Top White Orthe (2nd sowing) | 28 | 1,585 |
| 5. Half Long White (2nd sowing) | 28 | 1,585 |
| 6. Mammoth White Intermediate | 27 | 1,110 |

An average crop of 29 tons 301 lbs. per acre.

The six varieties of carrots which have produced the heaviest crops in 1901, taking the average of the results obtained at the several experimental farms, are the following :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White... .. .. .. .. .. | 26 | 523 | 4. Ontario Champion.... .. .. .. .. | 25 | 534 |
| 2. New White Intermediate... .. .. | 25 | 1,542 | 5. Mammoth White Intermediate... | 24 | 665 |
| 3. Giant White Vosges... .. .. .. .. | 25 | 1,432 | 6. Improved Short White.. .. .. .. | 23 | 1,448 |

An average crop of 25 tons 357 lbs. per acre.

## TRIAL PLOTS OF SUGAR BEETS.

Seven varieties of sugar beets have been tested during 1901, sown on drills or on the flat two feet apart. Two sowings were made at each farm, the second sowing about two weeks later than the first. The dates of sowing will be found in the accompanying table ; the dates on which the roots were pulled were as follows :—At Ottawa, October 14 ; Nappan, October 17 ; Brandon, September 24 ; Indian Head, October 1, and at Agassiz, November 6. The yield per acre in each instance has been calculated from the weight of roots gathered from two rows, each 66 feet long.

## UNIFORM TEST PLOTS OF SUGAR BEETS.

| Number. | Name of Variety. | Ottawa, Ont. | | Nappan, N. S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sown May 8. | Sown May 22. | Sown May 27. | Sown June 10. | Sown May 16. | Sown May 30. | Sown May 22. | Sown May 29. | Sown April 26. | Sown May 10. | First Sowing. | Second Sowing. |
| | | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre. Tons. Lbs. | Per acre Tons. Lbs. | Per acre. Tons. Lbs. |
| 1 | Red Top Sugar ........ .. | 34 640 | 25 1,150 | 27 780 | 30 225 | 30 984 | 29 1,136 | 27 912 | 25 1,348 | 13 400 | 15 30 | 26 1,143 | 25 378 |
| 2 | Royal Giant..... ........ | 33 660 | 29 1,070 | 25 1,645 | 26 1,625 | 18 960 | 18 696 | 29 1,664 | 26 8 | 16 1,165 | 17 816 | 24 1,619 | 23 1,243 |
| 3 | Danish Improved......... | 33 330 | 25 490 | 25 1,975 | 26 1,625 | 27 1,704 | 28 496 | 18 1,784 | 23 860 | 11 440 | 12 1,420 | 23 847 | 23 578 |
| 4 | Danish Red Top......... | 31 1,360 | 25 1,480 | 25 325 | 28 1,750 | 29 344 | 28 232 | 24 1,896 | 25 1,744 | 16 1,330 | 17 980 | 25 1,051 | 25 437 |
| 5 | Improved Imperial........ | 28 430 | 26 1,130 | 33 — | 28 1,750 | 18 960 | 26 1,856 | 27 1,440 | 20 1,844 | 16 1,990 | 13 1,720 | 24 1,764 | 23 860 |
| 6 | Wanzleben ............. | 25 160 | 21 1,890 | 25 655 | 21 900 | 25 160 | 22 1,672 | 16 1,396 | 19 1,600 | 9 480 | 9 150 | 20 570 | 19 42 |
| 7 | Vilmorin's Improved...... | 22 1,210 | 18 300 | 22 1,045 | 20 1,250 | 20 1,184 | 18 1,752 | 16 624 | 16 472 | 13 1,060 | 14 1,700 | 19 225 | 17 1,495 |

The crops from the two sowings of sugar beets at the experimental farms, in 1901, have averaged as follows:—

| | | Tons. | Lbs. |
|---|---|---|---|
| Central Experimental Farm, | first sowing..... | 29 | 1,541 |
| " " " | second sowing | 24 | 1,359 |
| Experimental Farm, Nappan, | first sowing | 26 | 918 |
| " " " | second sowing | 26 | 446 |
| " " Brandon, | first sowing | 24 | 614 |
| " " " | second sowing | 24 | 1,406 |
| " " Indian Head, | first sowing | 23 | 245 |
| " " " | second sowing | 22 | 1,125 |
| " " Agassiz, | first sowing | 13 | 1,838 |
| " " " | second sowing | 14 | 688 |

Average crop from all the plots at all the farms: first sowing, 23 tons 1,031 lbs.; second sowing, 22 tons 1,005 lbs., showing an advantage in favour of early sowing of 1 ton 26 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops during the season of 1901 are the following. (Unless otherwise stated, the yields given are all from the earlier sown plots) :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar.. .. .. .. .. .. .. .. | 34 | 640 | 3. Danish Improved.. .. .. .. .. .. | 33 | 330 |
| 2. Royal Giant... .. .. .. .. .. .. .. .. | 33 | 660 | 4. Danish Red Top... .. .. .. .. .. .. | 31 | 1,360 |

An average crop of 33 tons 497 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Improved Imperial.. .. .. .. .. .. .. | 33 | .. | 3. Danish Red Top (2nd sowing)... | 28 | 1,750 |
| 2. Red Top Sugar (2nd sowing)... .. | 30 | 225 | 4. Danish Improved (2nd sowing).. | 26 | 1,625 |

An average crop of 29 tons 1,400 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar.. .. .. .. .. .. .. .. | 30 | 984 | 3. Danish Improved (2nd sowing).. | 28 | 496 |
| 2. Danish Red Top.... .. .. .. .. .. .. | 29 | 344 | 4. Improved Imperial (2nd sowing) | 26 | 1,856 |

An average crop of 28 tons 1,420 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Royal Giant... .. .. .. .. .. .. .. .. | 29 | 1,664 | 3. Red Top Sugar.... .. .. .. .. .. .. | 27 | 912 |
| 2. Improved Imperial.... .. .. .. .. .. | 27 | 1,440 | 4. Danish Red Top (2nd sowing).... | 25 | 1,744 |

An average crop of 27 tons 1,440 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top (2nd sowing).... | 17 | 980 | 3. Improved Imperial... .. .. .. .. .. | 16 | 1,990 |
| 2. Royal Giant (2nd sowing)... .. .. | 17 | 816 | 4. Red Top Sugar.... .. .. .. .. .. .. | 15 | 30 |

An average crop of 16 tons 1,454 lbs. per acre.

The four varieties of sugar beets which have produced the heaviest crops in 1901, taking the average of the results obtained at the several experimental farms, are the following :—

| | Per acre. Tons. | Per acre. Lbs. | | Per acre. Tons. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar... .. .. .. .. .. .. .. | 26 | 1,143 | 3. Improved Imperial... .. .. .. .. .. | 24 | 1,764 |
| 2. Danish Red Top.... .. .. .. .. .. .. | 25 | 1,051 | 4. Royal Giant.. .. .. .. .. .. .. .. .. | 24 | 1,619 |

An average crop of 25 tons [illegible]94 lbs. per acre.

# TRIAL PLOTS OF POTATOES.

Eighty-seven varieties of potatoes have been under test in the uniform trial plots during 1901. The potatoes to be planted were cut into pieces, with two or three eyes in each, and these were planted in rows 2½ feet apart, the sets being placed a foot apart in the rows. The following were the dates of planting and digging :—At Ottawa, planted May 28, dug September 5 ; Nappan, planted May 17, dug September 23 ; Brandon, planted May 18, dug October 5 ; Indian Head, planted May 20, dug October 3, and at Agassiz, planted May 8 and 9 and dug October 22 :—

## UNIFORM TEST PLOTS OF POTATOES.

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1901. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. |
| 1 | Dreer's Standard..... | 506 | .. | 345 | 24 | 509 | 40 | 576 | .. | * | | 484 | 16 |
| 2 | Late Puritan ........ | 503 | 48 | 385 | .. | 476 | 40 | 556 | 48 | 556 | 36 | 495 | 34 |
| 3 | Early White Prize... | 501 | 36 | 259 | 36 | 458 | 20 | 390 | 24 | 429 | 54 | 407 | 58 |
| 4 | I. X. L........ ..... | 492 | 48 | 266 | 12 | 623 | 20 | 526 | 56 | 553 | 18 | 492 | 31 |
| 5 | Uncle Sam.......... | 484 | .. | 270 | 36 | 487 | 40 | 567 | 28 | 686 | 24 | 499 | 14 |
| 6 | Burnaby Seedling.... | 479 | 36 | 272 | 48 | 561 | .. | 584 | 32 | 607 | 12 | 501 | 2 |
| 7 | Canadian Beauty .... | 479 | 36 | 404 | 48 | 473 | .. | 520 | 40 | 470 | 48 | 469 | 46 |
| 8 | Sabean's Elephant.... | 473 | .. | 402 | 36 | 619 | 40 | 480 | .. | 569 | 48 | 509 | 1 |
| 9 | Green Mountain. .... | 470 | 48 | 266 | 12 | 414 | 20 | 657 | 4 | 553 | 18 | 472 | 20 |
| 10 | Seattle........ ..... | 462 | .. | 345 | 24 | 337 | 20 | 520 | 32 | 541 | 12 | 441 | 18 |
| 11 | Vick's Extra Early... | 462 | .. | 336 | 36 | 388 | 40 | 292 | 16 | 633 | 36 | 422 | 38 |
| 12 | Money Maker. ..... | 459 | 48 | 292 | 36 | 520 | 40 | 497 | 4 | 673 | 12 | 488 | 40 |
| 13 | American Wonder.... | 455 | 24 | 209 | .. | 586 | 40 | 599 | 28 | 523 | 36 | 474 | 50 |
| 14 | Holborn Abundance.. | 453 | 12 | 360 | 48 | 414 | 20 | 531 | 12 | 651 | 12 | 482 | 9 |
| 15 | Burpee's Extra Early. | 446 | 36 | 211 | 12 | 377 | 40 | 292 | 16 | 398 | 12 | 345 | 11 |
| 16 | Clay Rose ........... | 444 | 24 | 352 | .. | 469 | 20 | 548 | 16 | 613 | 48 | 485 | 34 |
| 17 | Maggie Murphy. ... | 440 | .. | 286 | .. | 484 | .. | 644 | 16 | 440 | .. | 458 | 51 |
| 18 | Early Puritan. . ... | 435 | 36 | 248 | 36 | 480 | 20 | 177 | 4 | 592 | 54 | 386 | 54 |
| 19 | Troy Seedling. . ... | 435 | 36 | 374 | .. | 381 | 20 | 482 | 8 | 554 | 24 | 445 | 30 |
| 20 | Rural Blush.......... | 433 | 24 | 345 | 48 | 473 | .. | 615 | .. | 444 | 24 | 462 | 19 |
| 21 | Rochester Rose ..... | 422 | 24 | 264 | .. | 352 | .. | 390 | 24 | 622 | 36 | 410 | 17 |
| 22 | McIntyre........... | 420 | 12 | 316 | 48 | 377 | 40 | 392 | 32 | 660 | .. | 433 | 26 |
| 23 | Cambridge Russet.... | 420 | 12 | 352 | .. | 473 | .. | 546 | 8 | 525 | 48 | 463 | 26 |
| 24 | Polaris.............. | 418 | .. | 187 | .. | 344 | 40 | 433 | 4 | 677 | 36 | 412 | 4 |
| 25 | Early St. George..... | 418 | .. | 308 | 36 | 421 | 40 | 428 | 48 | 448 | 58 | 405 | 12 |
| 26 | Carman No. 1........ | 415 | 48 | 250 | 48 | 539 | .. | 663 | 28 | 541 | 12 | 482 | 3 |
| 27 | State of Maine.... .. | 413 | 36 | 222 | 12 | 597 | 40 | 578 | 8 | 519 | 12 | 466 | 10 |
| 28 | Great Divide.. . . | 411 | 24 | 312 | 24 | 462 | .. | 548 | 16 | 371 | 48 | 421 | 10 |
| 29 | Early Norther........ | 409 | 12 | 272 | 48 | 498 | 40 | 375 | 28 | 475 | 12 | 406 | 16 |
| 30 | Rawdon Rose........ | 407 | .. | 336 | 36 | 418 | .. | 309 | 20 | 484 | .. | 390 | 59 |
| 31 | Earliest of All...... . | 407 | .. | 187 | .. | 308 | .. | 371 | 12 | 396 | .. | 333 | 50 |
| 32 | Vanier ............. | 402 | 36 | 327 | 48 | 509 | 40 | 369 | 4 | 675 | 24 | 456 | 54 |
| 33 | Enormous............ | 402 | 36 | 352 | .. | 542 | 40 | 373 | 20 | 506 | .. | 435 | 19 |
| 34 | Quaker City......... | 400 | 24 | 303 | 36 | 513 | 20 | 567 | 28 | 574 | 12 | 471 | 48 |
| 35 | Brown's Rot Proof.... | 398 | 12 | 356 | 24 | 575 | 40 | 396 | 48 | 533 | 30 | 452 | 7 |
| 36 | Early Harvest........ | 398 | 12 | 257 | 24 | 539 | .. | 437 | 20 | 528 | .. | 431 | 59 |
| 37 | Irish Cobbler........ | 396 | .. | 290 | 24 | 476 | 40 | 486 | 24 | 314 | 36 | 392 | 49 |
| 38 | Early Sunrise........ | 391 | 36 | 213 | 24 | 326 | 30 | 505 | 36 | 391 | 36 | 365 | 44 |
| 39 | Delaware............ | 389 | 24 | 279 | 24 | 425 | 20 | 603 | 44 | 543 | 24 | 448 | 15 |
| 40 | Wonder of the World. | 389 | 24 | † | | 517 | . | 268 | 48 | 501 | 36 | 419 | 12 |
| 41 | Everett .... ........ | 385 | .. | 294 | 48 | 462 | .. | 381 | 36 | 475 | 12 | 399 | 43 |
| 42 | General Gordon...... | 382 | 48 | 275 | .. | 476 | 40 | 612 | 16 | 537 | 54 | 456 | 56 |
| 43 | Reeves' Rose.... .... | 376 | 12 | 204 | 36 | 575 | 40 | 405 | 20 | 608 | 18 | 434 | 1 |
| 44 | Country Gentleman.. | 374 | .. | 292 | 36 | 491 | 20 | 610 | 8 | 509 | 18 | 455 | 29 |

* Not planted at Agassiz. † Not planted at Nappan.

## UNIFORM TEST PLOTS OF POTATOES—*Concluded.*

| Number. | Name of Variety. | Yield at the Several Experimental Farms, Season of 1901. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ottawa, Ont. | | Nappan, N.S. | | Brandon, Man. | | Indian Head, N.W.T. | | Agassiz, B.C. | | Average of all Farms. | |
| | | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. | Per acre. Bush. | Lbs. |
| 45 | Lee's Favourite...... | 369 | 36 | 220 | .. | 414 | 20 | 396 | 48 | 614 | 54 | 403 | 8 |
| 46 | New Queen......... | 369 | 36 | 264 | .. | 469 | 20 | 458 | 40 | 521 | 24 | 416 | 36 |
| 47 | American Giant...... | 367 | 24 | 272 | 48 | 502 | 20 | 599 | 52 | 662 | 12 | 480 | 55 |
| 48 | Early Michigan.... | 367 | 24 | 171 | 36 | 410 | 40 | 480 | .. | 500 | 30 | 386 | 2 |
| 49 | Sir Walter Raleigh.. | 365 | 12 | 310 | 12 | 396 | .. | 398 | 56 | 312 | 24 | 356 | 33 |
| 50 | Flemish Beauty...... | 365 | 12 | 288 | 12 | 388 | 40 | 499 | 12 | 606 | 6 | 429 | 28 |
| 51 | Seedling No. 7..... | 365 | 12 | 356 | 24 | 506 | .. | 505 | 36 | 618 | 12 | 470 | 17 |
| 52 | Seedling No. 230..... | 360 | 48 | 308 | 12 | 465 | 40 | 569 | 36 | 624 | 48 | 465 | 49 |
| 53 | Rural No. 2.......... | 354 | 12 | 360 | 48 | 352 | .. | 315 | 44 | 352 | .. | 346 | 57 |
| 54 | Northern Spy........ | 354 | 12 | 286 | .. | 506 | .. | 616 | 32 | 616 | .. | 475 | 45 |
| 55 | Sharpe's Seedling.... | 345 | 24 | 224 | 24 | 311 | 40 | 486 | 24 | 533 | 30 | 380 | 16 |
| 56 | Dakota Red.... .... | 343 | 12 | 290 | 24 | 425 | 20 | 595 | 12 | 682 | .. | 467 | 14 |
| 57 | Swiss Snow Flake.... | 338 | 48 | 352 | .. | 480 | 20 | 548 | 16 | 673 | 12 | 478 | 31 |
| 58 | Early Rose ......... | 336 | 36 | 187 | .. | 440 | .. | 243 | 12 | 437 | 38 | 328 | 53 |
| 59 | Early Ohio .......... | 336 | 36 | 176 | .. | 333 | 40 | 362 | 40 | 338 | 48 | 309 | 33 |
| 60 | Pearce's Extra Early. | 336 | 36 | 297 | .. | 495 | .. | 379 | 44 | 347 | 36 | 371 | 11 |
| 61 | Early Market ....... | 336 | 36 | 193 | 36 | 399 | 40 | 298 | 40 | 316 | 48 | 309 | 4 |
| 62 | Irish Daisy.......... | 336 | 36 | 418 | .. | 414 | 20 | 582 | 24 | 580 | 48 | 466 | 26 |
| 63 | Early Andes.. ...... | 334 | 24 | 255 | 12 | 209 | .. | 260 | 16 | 475 | 12 | 306 | 49 |
| 64 | Bovee............... | 334 | 24 | 191 | 24 | 462 | .. | 416 | .. | 629 | 12 | 406 | 36 |
| 65 | Thorburn............ | 327 | 48 | 277 | 12 | 403 | 20 | 392 | 32 | 435 | 36 | 367 | 18 |
| 66 | Prize Taker..... .... | 325 | 36 | 290 | 24 | 374 | .. | 477 | 52 | 613 | 48 | 416 | 20 |
| 67 | Rose No. 9........... | 321 | 12 | 418 | .. | 531 | 40 | 571 | 44 | 545 | 36 | 477 | 38 |
| 68 | White Beauty........ | 319 | .. | 316 | 48 | 553 | 40 | 443 | 44 | 413 | 36 | 409 | 22 |
| 69 | Chicago Market...... | 316 | 48 | 211 | 12 | 421 | 40 | 573 | 52 | 479 | 46 | 400 | 40 |
| 70 | Daisy................ | 314 | 36 | 200 | 12 | 597 | 40 | 334 | 56 | 558 | 48 | 401 | 14 |
| 71 | Pearce's Prize Winner | 314 | 36 | 323 | 24 | 432 | 40 | 492 | 48 | 400 | 34 | 392 | 48 |
| 72 | Carman No. 3... ... | 312 | 24 | 341 | .. | 418 | .. | 629 | 20 | 585 | 12 | 457 | 11 |
| 73 | Empire State......... | 308 | .. | 233 | 12 | 484 | .. | 524 | 48 | 594 | .. | 428 | 48 |
| 74 | Ohio Junior.......... | 308 | .. | 275 | .. | 311 | 40 | 300 | 48 | 365 | 12 | 312 | 8 |
| 75 | Penn Manor.......... | 305 | 48 | 341 | .. | 462 | .. | 531 | 12 | 352 | .. | 398 | 24 |
| 76 | Early Six Weeks..... | 303 | 36 | 220 | .. | 392 | 20 | 392 | 32 | 343 | 12 | 330 | 20 |
| 77 | Beauty of Hebron ... | 294 | 48 | 330 | .. | 425 | 20 | 430 | 56 | 514 | 48 | 399 | 10 |
| 78 | Maule's Thoro'bred.. | 290 | 24 | 268 | 24 | 513 | 20 | 311 | 28 | 479 | 46 | 372 | 40 |
| 79 | Hale's Champion..... | 290 | 24 | 336 | 36 | 737 | .. | 477 | 52 | 613 | 48 | 491 | 8 |
| 80 | Reading Giant.. .. | 286 | .. | 209 | .. | 403 | 20 | 475 | 44 | * | | 343 | 31 |
| 81 | Lizzie's Pride........ | 275 | .. | 259 | 36 | 517 | .. | 541 | 52 | 510 | 24 | 420 | 46 |
| 82 | New Variety No. 1... | 270 | 36 | 253 | .. | 414 | 20 | 590 | 56 | 629 | 12 | 431 | 37 |
| 83 | Prolific Rose......... | 264 | .. | 319 | .. | 590 | 20 | 366 | 56 | 385 | 32 | 385 | 10 |
| 84 | Bill Nye.............. | 253 | .. | 341 | .. | 520 | 40 | 526 | 56 | 431 | .. | 414 | 31 |
| 85 | Clarke's No. 1........ | 242 | .. | 187 | .. | 498 | 40 | † | | 364 | 6 | 322 | 56 |
| 86 | Brownell's Winner... | 231 | .. | 332 | 12 | 546 | 20 | 433 | 4 | 547 | 48 | 418 | 5 |
| 87 | Houlton Rose........ | 228 | 48 | 332 | 12 | 465 | 40 | 428 | 48 | 542 | 18 | 399 | 33 |
| 88 | Up to Date.......... | 226 | 36 | 211 | 12 | 212 | 40 | † | | 426 | 48 | 269 | 19 |
| 89 | Pride of the Market. | 173 | 48 | 341 | .. | 421 | 40 | 458 | 40 | 430 | 39 | 365 | 9 |

* Not planted at Agassiz. †Not planted at Indian Head.

The twelve varieties of potatoes which have produced the largest crops at the several experimental farms during the season of 1901 are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Dreer's Standard... | 506 | .. | 7. Canadian Beauty.. | 479 | 36 |
| 2. Late Puritan.. | 503 | 48 | 8. Sabean's Elephant... | 473 | .. |
| 3. Early White Prize.. | 501 | 36 | 9. Green Mountain... | 470 | 48 |
| 4. I. X. L... | 492 | 48 | 10. Seattle.... | 462 | .. |
| 5. Uncle Sam... | 484 | .. | 11. Vick's Extra Early.. | 462 | .. |
| 6. Burnaby Seedling.. | 479 | 36 | 12. Money Maker... | 459 | 48 |

An average crop of 481 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rose, No. 9... | 418 | .. | 7. Holborn Abundance.... | 360 | 48 |
| 2. Irish Daisy... | 418 | .. | 8. Rural, No. 2.... | 360 | 48 |
| 3. Canadian Beauty... | 404 | 48 | 9. Seedling, No. 7.... | 356 | 24 |
| 4. Sabean's Elephant.. | 402 | 36 | 10. Brown's Rot Proof... | 356 | 24 |
| 5. Late Puritan.... | 385 | .. | 11. Clay Rose... | 352 | .. |
| 6. Troy Seedling... | 374 | .. | 12. Cambridge Russet... | 352 | .. |

An average crop of 378 bushels 24 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Hale's Champion... | 737 | .. | 7. American Wonder... | 586 | 40 |
| 2. I. X. L..... | 623 | 20 | 8. Brown's Rot Proof... | 575 | 40 |
| 3. Sabean's Elephant.... | 619 | 40 | 9. Reeve's Rose... | 575 | 40 |
| 4. Daisy... | 597 | 40 | 10. Burnaby Seedling.. | 561 | .. |
| 5. State of Maine.. | 597 | 40 | 11. White Beauty.. | 553 | 40 |
| 6. Prolific Rose.... | 590 | 20 | 12. Brownell's Winner... | 546 | 20 |

An average crop of 597 bushels 3 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Carman, No. 1... | 663 | 28 | 7. General Gordon... | 612 | 16 |
| 2. Green mountain.... | 657 | 4 | 8. Country Gentleman.. | 610 | 8 |
| 3. Maggie Murphy.... | 644 | 16 | 9. Delaware.. | 603 | 44 |
| 4. Carman, No. 3... | 629 | 20 | 10. American Giant... | 599 | 52 |
| 5. Northern Spy.... | 616 | 32 | 11. American Wonder... | 599 | 28 |
| 6. Rural Blush.. | 615 | .. | 12. Dakota Red.. | 595 | 12 |

An average crop of 620 bushels 31 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Uncle Sam.... | 686 | 24 | 7. American Giant... | 662 | 12 |
| 2. Dakota Red... | 682 | .. | 8. McIntyre.. | 660 | .. |
| 3. Polaris.. | 677 | 36 | 9. Holborn Abundance.. | 651 | 12 |
| 4. Vanier.. | 675 | 24 | 10. Vick's Extra Early... | 633 | 36 |
| 5. Money Maker.... | 673 | 12 | 11. Bovee.. | 629 | 12 |
| 6. Swiss Snow Flake.. | 673 | 12 | 12. New Variety, No. 1.. | 629 | 12 |

An average crop of 661 bushels 5 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops in 1901, taking the average of the results obtained at all the experimental farms, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Sabean's Elephant | 509 | 1 | 7. Money Maker | 488 | 40 |
| 2. Burnaby Seedling | 501 | 2 | 8. Clay Rose | 485 | 34 |
| 3. Uncle Sam | 499 | 14 | 9. Dreer's Standard | 484 | 16 |
| 4. Late Puritan | 495 | 34 | 10. Holborn Abundance | 482 | 9 |
| 5. I. X. L. | 492 | 31 | 11. Carman, No. 1 | 482 | 3 |
| 6. Hale's Champion | 491 | 8 | 12. American Giant | 480 | 55 |

An average crop of 496 bushels 1 lb. per acre.

The average crop of all the varieties of potatoes tested at each of the experimental farms was as follows:—At Ottawa, 380 bushels 21 lbs. per acre ; Nappan, 294 bushels; Brandon, 468 bushels 52 lbs.; Indian Head, 480 bushels 26 lbs.; and at Agassiz, 528 bushels 30 lbs. The average return given, including all the varieties on the whole of the farms, was 430 bushels 26 lbs. per acre.

## AVERAGE OF CROPS FOR THE LAST FOUR TO SEVEN YEARS.

The results of experiments with different varieties of the more important agricultural crops to ascertain their relative productiveness become much more reliable and conclusive when the average experience of a series of years can be given. In this way variations arising from inequality of soil and variability of season are, to a large extent equalized and the conclusions reached become a much more valuable guide to the farmer in his selection of seed. The longer the experiments are continued, the more accurate are the indications which can be given. The experiences here recorded with most of the crops under test now cover a period of from five to seven years.

## SIX AND SEVEN YEARS' EXPERIENCE WITH VARIETIES OF OATS.

The twelve varieties of oats which have averaged the heaviest crops at the several experimental farms during the past six and seven years are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

*Average for seven years.*

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Banner.. .. .. .. .. .. .. .. .. .. | 65 | 30 | 7. Columbus.... .. .. .. .. .. .. .. .. | 61 | 11 |
| 2. American Triumph.... .. .. .. .. | 64 | 7 | 8. Golden Beauty.. .. .. .. .. .. .. .. | 60 | 22 |
| 3. Joanette.... .. .. .. .. .. .. .. .. .. | 63 | 11 | 9. Oderbruch... .. .. .. .. .. .. .. .. | 60 | 13 |
| 4. Holstein Prolific... .. .. .. .. .. | 63 | 7 | 10. Improved Ligowo.... .. .. .. .. | 60 | 11 |
| 5. American Beauty.. .. .. .. .. .. | 61 | 24 | 11. Abundance... .. .. .. .. .. .. .. .. | 59 | 29 |
| 6. Golden Giant.... .. .. .. .. .. .. | 61 | 16 | 12. Hazlett's Seizure.. .. .. .. .. .. | 59 | 20 |

An average crop of 61 bushels 28 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

*Average for six and seven years.*

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Wallis... .. .. .. .. .. .. .. .. .. .. | 73 | 7 | 7. Banner... .. .. .. .. .. .. .. .. .. | 69 | 3 |
| 2. White Russian.. .. .. .. .. .. .. .. | 71 | 6 | 8. White Schonen.... .. .. .. .. .. | 68 | 13 |
| 3. Oderbruch.. .. .. .. .. .. .. .. .. .. | 70 | 23 | 9. Golden Beauty.... .. .. .. .. .. | 68 | 11 |
| 4. Lincoln.... .. .. .. .. .. .. .. .. .. | 70 | .. | 10. Abyssinia.... .. .. .. .. .. .. .. .. | 68 | 8 |
| 5. Cream Egyptian.... .. .. .. .. .. | 69 | 14 | 11. American Beauty.. .. .. .. .. .. | 67 | 25 |
| 6. Early Blossom.. .. .. .. .. .. .. | 69 | 11 | 12. Pense, 6 yrs.. .. .. .. .. .. .. .. | 67 | 25 |

An average crop of 69 bushels 15 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

*Average for six years.*

| | Per acre. | | | Per acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. American Beauty.. .. .. .. .. .. | 95 | 32 | 7. Holstein Prolific.. .. .. .. .. .. | 83 | 15 |
| 2 Banner.... .. .. .. .. .. .. .. .. .. | 92 | 24 | 8. Golden Giant... .. .. .. .. .. .. | 83 | 4 |
| 3. Bavarian... .. .. .. .. .. .. .. .. .. | 92 | 4 | 9. American Triumph.. .. .. .. .. | 82 | 9 |
| 4 Early Golden Prolific.... .. .. .. | 85 | 2 | 10. Abundance.. .. .. .. .. .. .. .. .. | 79 | 1 |
| 5. Golden Beauty.. .. .. .. .. .. .. | 83 | 26 | 11. Columbus.... .. .. .. .. .. .. .. | 78 | 6 |
| 6. White Schonen.. .. .. .. .. .. .. | 83 | 26 | 12. Lincoln... .. .. .. .. .. .. .. .. .. | 78 | 1 |

An average crop of 84 bushels 27 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

*Average for six years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Abundance.. .. .. .. .. .. .. .. | 95 | 15 | 7. Early Golden Prolific... .. .. .. | 89 | 2 |
| 2 American Beauty.. .. .. .. .. .. | 95 | 9 | 8. American Triumph.. .. .. .. .. | 88 | 31 |
| 3. Columbus.. .. .. .. .. .. .. .. .. | 93 | 22 | 9. Banner.... .. .. .. .. .. .. .. .. | 88 | 30 |
| 4 Holstein Prolific... .. .. .. .. .. | 92 | 14 | 10. Bavarian.... .. .. .. .. .. .. .. | 87 | 22 |
| 5. Golden Beauty... .. .. .. .. .. .. | 90 | 28 | 11. Early Archangel.. .. .. .. .. .. | 86 | 3 |
| 6. Wide Awake.. .. .. .. .. .. .. .. | 89 | 31 | 12. Abyssinia.... .. .. .. .. .. .. .. | 85 | 7 |

An average crop of 90 bushels 9 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

*Average for six and seven years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Golden Giant.... .. .. .. .. .. .. | 68 | 18 | 7. Holstein Prolific.. .. .. .. .. .. | 62 | 14 |
| 2. Banner.. .. .. .. .. .. .. .. .. .. | 65 | 15 | 8. Early Golden Prolific... .. .. .. | 61 | 33 |
| 3. Lincoln.... .. .. .. .. .. .. .. .. | 64 | 28 | 9. Abyssinia.... .. .. .. .. .. .. .. | 61 | 17 |
| 4. Buckbee's Illinois, 6 yrs.... .. .. | 63 | 31 | 10. Bavarian.. .. .. .. .. .. .. .. .. | 60 | 27 |
| 5. Early Blossom... .. .. .. .. .. .. | 63 | 19 | 11. Oderbruch... .. .. .. .. .. .. .. | 60 | 23 |
| 6. Early Gothland.. .. .. .. .. .. .. | 62 | 28 | 12. Prolific Black Tartarian... .. .. | 60 | 3 |

An average crop of 63 bushels 1 lb. per acre.

The twelve varieties of oats which have produced the largest average crop for the past six or seven years on all the experimental farms, and hence may, perhaps, be regarded as worthy of being placed at the head of the list for general cultivation in Canada, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Banner.. .. .. .. .. .. .. .. .. .. | 76 | 14 | 7. Golden Beauty.... .. .. .. .. .. | 71 | 32 |
| 2. American Beauty.. .. .. .. .. .. | 75 | 33 | 8. Columbus.... .. .. .. .. .. .. .. | 71 | 17 |
| 3. Mennonite.. .. .. .. .. .. .. .. .. | 75 | 23 | 9. Golden Giant... .. .. .. .. .. .. | 71 | 8 |
| 4. Holstein Prolific... .. .. .. .. .. | 72 | 31 | 10. Early Golden Prolific... .. .. .. | 71 | .. |
| 5. Bavarian.. .. .. .. .. .. .. .. .. | 72 | 21 | 11. Abundance.. .. .. .. .. .. .. .. | 70 | 20 |
| 6. Buckbee's Illinois.. .. .. .. .. .. | 72 | 4 | 12. American Triumph... .. .. .. .. | 70 | 20 |

An average crop of 72 bushels 24 lbs. per acre.

# SIX AND SEVEN YEARS' EXPERIENCE WITH VARIETIES OF BARLEY.

## TWO-ROWED BARLEY.

The six varieties of two-rowed barley, which have averaged the heaviest crops at the several experimental farms during the past six or seven years, are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

*Average for seven years.*

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Beaver.. .. .. .. .. .. .. .. .. .. .. .. | 45 | 22 |
| 2. Canadian Thorpe... .. .. .. .. .. .. | 44 | 24 |
| 3. Danish Chevalier.. .. .. .. .. .. .. | 44 | .. |
| 4. French Chevalier.... .. .. .. .. .. | 42 | 45 |
| 5. Nepean... .. .. .. .. .. .. .. .. .. .. | 41 | 9 |
| 6. Sidney.. .. .. .. .. .. .. .. .. .. .. .. | 40 | 38 |

An average crop of 43 bushels 7 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

*Average for seven years.*

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Beaver.. .. .. .. .. .. .. .. .. .. .. .. | 44 | 40 |
| 2. French Chevalier.. .. .. .. .. .. .. | 43 | 4 |
| 3. Danish Chevalier.. .. .. .. .. .. .. | 41 | 41 |
| 4. Newton.... .. .. .. .. .. .. .. .. .. .. | 41 | 8 |
| 5. Canadian Thorpe.. .. .. .. .. .. .. | 40 | 40 |
| 6. Nepean... .. .. .. .. .. .. .. .. .. .. | 40 | .. |

An average crop of 41 bushels 46 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

*Average for five and six years.*

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. French Chevalier.. .. .. .. .. .. .. | 46 | 25 |
| 2. Sidney... .. .. .. .. .. .. .. .. .. .. | 45 | 32 |
| 3. Nepean.... .. .. .. .. .. .. .. .. .. | 44 | 41 |
| 4. Bolton.... .. .. .. .. .. .. .. .. .. .. | 43 | 29 |
| 5. Newton... .. .. .. .. .. .. .. .. .. .. | 42 | 31 |
| 6. Victor, 5 yrs... .. .. .. .. .. .. .. | 42 | 16 |

An average crop of 44 bushels 13 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

*Average for six years.*

| | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. French Chevalier.. .. .. .. .. .. .. | 59 | 41 |
| 2. Danish Chevalier... .. .. .. .. .. .. | 58 | 13 |
| 3. Prize Prolific.... .. .. .. .. .. .. | 54 | 33 |
| 4. Canadian Thorpe.. .. .. .. .. .. .. | 54 | 32 |
| 5. Sidney.. .. .. .. .. .. .. .. .. .. .. | 54 | 8 |
| 6. Bolton.... .. .. .. .. .. .. .. .. .. | 51 | 19 |

An average crop of 55 bushels 24 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

*Average for seven years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Canadian Thorpe | 38 | 13 | 4. Danish Chevalier | 37 | 21 |
| 2. French Chevalier | 38 | 12 | 5. Kinver Chevalier | 37 | 9 |
| 3. Beaver | 38 | 11 | 6. Prize Prolific | 36 | 38 |

An average crop of 37 bushels 33 lbs. per acre.

The six varieties of two-rowed barley which have produced the largest crops for the past six or seven years, taking the average of the results obtained on all the experimental farms, are the following :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. French Chevalier | 46 | 6 | 4. Canadian Thorpe | 43 | 26 |
| 2. Beaver | 43 | 39 | 5. Nepean | 42 | 7 |
| 3. Danish Chevalier | 43 | 31 | 6. Newton | 42 | 3 |

An average crop of 43 bushels 27 lbs. per acre.

SIX-ROWED BARLEY.

The six varieties of six-rowed barley which have averaged the heaviest crops at the several experimental farms for the past six or seven years, are the following :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

*Average for seven years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Odessa | 53 | 14 | 4. Pioneer | 49 | 19 |
| 2. Mensury | 52 | 20 | 5. Stella | 45 | 41 |
| 3. Royal | 50 | 26 | 6. Oderbruch | 45 | 24 |

An average crop of 49 bushels 24 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

*Average for seven years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 52 | 29 | 4. Baxter | 44 | 28 |
| 2. Odessa | 45 | 32 | 5. Trooper | 44 | 11 |
| 3. Oderbruch | 45 | 29 | 6. Surprise | 43 | 31 |

An average crop of 46 bushels 3 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

*Average for six years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Mensury | 54 | 1 | 4. Nugent | 50 | 15 |
| 2. Trooper | 52 | 25 | 5. Summit | 50 | 2 |
| 3. Common | 51 | 29 | 6. Surprise | 48 | 31 |

An average crop of 51 bushels 9 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

*Average for six years.*

| | Per acre. Bush. | Per acre. Lbs. | | Per acre. Bush. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Odessa.. .. .. .. .. .. .. .. .. .. | 61 | 19 | 4. Trooper... .. .. .. .. .. .. .. .. | 58 | 26 |
| 2. Rennie's Improved.... .. .. .. .. | 60 | 28 | 5. Common.. .. .. .. .. .. .. .. .. | 57 | 3 |
| 3. Mensury... .. .. .. .. .. .. .. .. | 59 | 41 | 6. Baxter.... .. .. .. .. .. .. .. .. | 56 | 17 |

An average crop of 58 bushels 46 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

*Average for six and seven years.*

| | Per acre. Bush. | Per acre. Lbs. | | Per acre. Bush. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Mensury... .. .. .. .. .. .. .. .. | 39 | 8 | 4. Odessa.... .. .. .. .. .. .. .. .. | 37 | 29 |
| 2. Baxter, 6 yrs.... .. .. .. .. .. .. | 38 | 7 | 5. Common... .. .. .. .. .. .. .. .. | 37 | 9 |
| 3. Royal.... .. .. .. .. .. .. .. .. .. | 37 | 37 | 6. Nugent.... .. .. .. .. .. .. .. .. | 35 | 32 |

An average crop of 37 bushels 28 lbs. per acre.

The six varieties of six-rowed barley which have produced the largest crops for the past six or seven years, taking the average of the results obtained at all the experimental farms, are the following :—

| | Per acre. Bush. | Per acre. L . | | Per acre. Bush. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1 Mensury... .. .. .. .. .. .. .. .. | 51 | 29 | 4. Common.. .. .. .. .. .. .. .. .. | 46 | 38 |
| 2 Odessa.. .. .. .. .. .. .. .. .. .. | 48 | 19 | 5. Royal... .. .. .. .. .. .. .. .. .. | 46 | 32 |
| 3. Trooper.... .. .. .. .. .. .. .. .. | 47 | 4 | 6. Oderbruch... .. .. .. .. .. .. .. | 45 | 35 |

An average crop of 47 bushels 34 lbs. per acre.

## FIVE TO SEVEN YEARS' EXPERIENCE WITH VARIETIES OF SPRING WHEAT.

The twelve varieties of spring wheat which have averaged the heaviest crops at the several experimental farms during the past five to seven years are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

*Average for six and seven years.*

| | Per acre. Bush. | Per acre. Lbs. | | Per acre. Bush. | Per acre. Lbs. |
|---|---|---|---|---|---|
| 1. Preston.... .. .. .. .. .. .. .. .. | 28 | 31 | 7. Rio Grande.. .. .. .. .. .. .. .. | 25 | 3 |
| 2. Wellman's Fife.. .. .. .. .. .. .. | 26 | 37 | 8. Pringle's Champlain.... .. .. .. | 24 | 48 |
| 3. Huron... .. .. .. .. .. .. .. .. .. | 26 | 15 | 9. Monarch... .. .. .. .. .. .. .. .. | 24 | 27 |
| 4. Goose... .. .. .. .. .. .. .. .. .. | 26 | 8 | 10. White Fife... .. .. .. .. .. .... | 23 | 57 |
| 5. Colorado... .. .. .. .. .. .. .. .. | 25 | 29 | 11. Stanley.... .. .. .. .. .. .. .. | 23 | 46 |
| 6. Hungarian, 6 yrs... .. .. .. .. .. | 25 | 26 | 12. Crown.. .. .. .. .. .. .. .. .. | 23 | 38 |

An average crop of 2[illegible] bushels 21 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

*Average for six and seven years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Connell | 34 | 43 | 7. Rio Grande | 32 | 23 |
| 2. Monarch, 6 yrs | 34 | 26 | 8. Advance | 32 | 14 |
| 3. Wellman's Fife | 34 | 6 | 9. Red Fern | 32 | 14 |
| 4. Preston | 33 | 11 | 10. Huron | 31 | 59 |
| 5 Hungarian | 33 | 2 | 11. Goose | 31 | 54 |
| 6. White Russian | 32 | 54 | 12. Stanley | 31 | 34 |

An average crop of 32 bushels 53 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

*Average for five and six years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Goose | 40 | 48 | 7. Pringle's Champlain | 35 | 38 |
| 2. White Fife | 38 | 17 | 8. White Connell | 35 | 23 |
| 3. Crown | 37 | 35 | 9. Rio Grande | 35 | 5 |
| 4 Red Fife | 37 | 5 | 10. White Russian | 34 | 38 |
| 5. Monarch | 36 | 57 | 11. Wellman's Fife | 34 | 5 |
| 6. Preston, 5 yrs | 35 | 41 | 12. Advance | 33 | 52 |

An average crop of 36 bushels 15 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

*Average for six years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Huron | 44 | 32 | 7. Percy | 42 | 22 |
| 2. Red Fife | 44 | 12 | 8. Stanley | 41 | 57 |
| 3. Wellman's Fife | 43 | 17 | 9. White Fife | 41 | 38 |
| 4. Beaudry | 43 | 2 | 10. Monarch | 41 | 17 |
| 5. Red Fern | 42 | 45 | 11. Alpha | 41 | 7 |
| 6. Preston | 42 | 43 | 12. Rio Grande | 40 | 50 |

An average crop of 42 bushels 28 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

*Average for six and seven years.*

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Countess, 6 yrs | 30 | 10 | 7. Monarch | 28 | 35 |
| 2. Preston | 29 | 45 | 8. Dufferin, 6 yrs | 28 | 32 |
| 3. Hungarian, 6 yrs | 29 | 2 | 9. Dawn, 6 yrs | 28 | 30 |
| 4. Huron | 28 | 53 | 10. Alpha | 28 | 7 |
| 5. Vernon, 6 yrs | 28 | 40 | 11. Red Fern | 28 | 6 |
| 6. Red Fife | 28 | 37 | 12. Progress | 27 | 48 |

An average crop of 28 bushels 44 lbs. per acre.

The twelve varieties of spring wheat which have produced the largest crops for the past six or seven years, taking the average of the results obtained on all the experimental farms, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Preston.... .. .. .. .. .. .. .. .. .. | 33 | 58 | 7. White Fife... .. .. .. .. .. .. .. .. | 32 | 29 |
| 2. Wellman's Fife.. .. .. .. .. .. .. .. | 33 | 8 | 8. Hungarian... .. .. .. .. .. .. .. .. | 32 | 10 |
| 3. Monarch... .. .. .. .. .. .. .. .. .. | 33 | 8 | 9. White Connell.. .. .. .. .. .. .. .. | 32 | 6 |
| 4. Goose.... .. .. .. .. .. .. .. .. .. .. | 32 | 50 | 10. White Russian.. .. .. .. .. .. .. | 32 | 6 |
| 5. Huron... .. .. .. .. .. .. .. .. .. .. | 32 | 45 | 11. Rio Grande.. .. .. .. .. .. .. .. .. | 32 | 6 |
| 6. Red Fife... .. .. .. .. .. .. .. .. .. | 32 | 30 | 12. Pringle's Champlain.... .. .. .. | 31 | 56 |

An average crop of 32 bushels 36 lbs. per acre.

## FOUR TO SEVEN YEARS' EXPERIENCE WITH VARIETIES OF PEASE.

The twelve varieties of pease which have averaged the heaviest crops at the several experimental farms, for the past four to seven years, are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Arthur, 6 yrs.... .. .. .. .. .. .. .. | 37 | 35 | 7. Mummy, 6 yrs.. .. .. .. .. .. .. .. | 32 | 55 |
| 2. Canadian Beauty, 5 yrs.. .. .. .. | 35 | 34 | 8. Black-eyed Marrowfat, 6 yrs.... | 32 | 45 |
| 3. Kent, 5 yrs... .. .. .. .. .. .. .. .. | 34 | 38 | 9. Agnes, 6 yrs.... .. .. .. .. .. .. .. | 32 | 38 |
| 4. Paragon, 6 yrs.. .. .. .. .. .. .. .. | 34 | 32 | 10. Prussian Blue, 7 yrs.... .. .. .. | 32 | 22 |
| 5. Duke, 6 yrs... .. .. .. .. .. .. .. .. | 33 | 45 | 11. Mackay, 6 yrs.. .. .. .. .. .. .. .. | 32 | 23 |
| 6. Macoun, 5 yrs.... .. .. .. .. .. .. .. | 33 | 44 | 12. Creeper, 6 yrs.. .. .. .. .. .. .. | 32 | 15 |

An average crop of 33 bushels 46 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Bush. | Lbs | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown, 6 yrs.. .. .. .. .. .. .. .. .. | 39 | 50 | 7. Agnes, 5 yrs.... .. .. .. .. .. .. .. | 30 | 4 |
| 2. Pride, 5 yrs... .. .. .. .. .. .. .. .. | 36 | 20 | 8. Carleton, 5 yrs.. .. .. .. .. .. .. .. | 30 | 3 |
| 3. Centennial, 6 yrs... .. .. .. .. .. .. | 33 | 7 | 9. Paragon, 5 yrs.. .. .. .. .. .. .. .. | 29 | 15 |
| 4. New Potter, 6 yrs.. .. .. .. .. .. .. | 32 | 17 | 10. Multiplier, 6 yrs.. .. .. .. .. .. .. | 28 | 50 |
| 5. Black-eyed Marrowfat, 6 yrs.. .. | 32 | .. | 11. Perth, 4 yrs.. .. .. .. .. .. .. .. .. | 28 | 45 |
| 6. Duke, 5 yrs... .. .. .. .. .. .. .. .. | 30 | 27 | 12. Archer, 4 yrs... .. .. .. .. .. .. .. | 28 | 25 |

An average crop of 31 bushels 37 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Pride, 7 yrs... .. .. .. .. .. .. .. .. | 45 | 26 | 7. Trilby, 6 yrs.... .. .. .. .. .. .. .. | 42 | 8 |
| 2. Carleton, 6 yrs.. .. .. .. .. .. .. .. | 44 | 50 | 8. Crown, 6 yrs... .. .. .. .. .. .. .. | 41 | 53 |
| 3. Mummy, 7 yrs.... .. .. .. .. .. .. .. | 44 | 40 | 9. Kent, 6 yrs.. .. .. .. .. .. .. .. .. | 40 | 37 |
| 4. New Potter, 7 yrs.. .. .. .. .. .. .. | 42 | 44 | 10. Prussian Blue, 5 yrs.... .. .. .. | 40 | 6 |
| 5. White Wonder, 5 yrs.. .. .. .. .. .. | 42 | 42 | 11. Archer, 5 yrs... .. .. .. .. .. .. .. | 40 | 4 |
| 6. King, 5 yrs.... .. .. .. .. .. .. .. .. | 42 | 28 | 12. Mackay, 6 yrs.. .. .. .. .. .. .. .. | 39 | 53 |

An average crop of 42 bushels 17 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Trilby, 5 yrs | 43 | 8 | 7. Archer, 4 yrs | 38 | 47 |
| 2 Paragon, 5 yrs | 42 | 50 | 8. Prince Albert, 5 yrs | 37 | 50 |
| 3. Crown, 5 yrs | 41 | 30 | 9. King, 4 yrs | 37 | 40 |
| 4. Carleton, 5 yrs | 40 | 46 | 10. Duke, 5 yrs | 37 | 38 |
| 5. White Wonder, 4 yrs | 39 | 27 | 11. Perth, 4 yrs | 37 | 30 |
| 6. Pride, 5 yrs | 38 | 52 | 12. Macoun, 5 yrs | 37 | 16 |

An average crop of 39 bushels 26 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. White Wonder, 5 yrs | 37 | 22 | 7. Elephant Blue, 5 yrs | 33 | 42 |
| 2. King, 5 yrs | 37 | 8 | 8. Vincent, 5 yrs | 33 | 10 |
| 3. Early Britain, 5 yrs | 36 | 39 | 9. Chancellor, 5 yrs | 32 | 40 |
| 4. Victoria, 5 yrs | 35 | 27 | 10. Harrison's Glory, 5 yrs | 32 | 35 |
| 5. Perth | 34 | 36 | 11. Archer, 5 yrs | 32 | 33 |
| 6. Arthur, 6 yrs | 34 | 8 | 12. Prussian Blue, 5 yrs | 32 | 21 |

An average crop of 34 bushels 23 lbs. per acre.

The twelve varieties of pease which have produced the largest crops for the past four to seven years, taking the average of the results obtained at all the experimental farms, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Crown, 7 yrs | 36 | 40 | 7. Paragon, 6 yrs | 34 | 26 |
| 2. Pride, 7 yrs | 36 | .. | 8. Duke, 6 yrs | 34 | 23 |
| 3. Carleton, 6 yrs | 35 | 36 | 9. Perth, 5 yrs | 33 | 53 |
| 4. Early Britain, 5 yrs | 34 | 53 | 10. Agnes, 6 yrs | 33 | 52 |
| 5. King, 5 yrs | 34 | 36 | 11. Archer, 5 yrs | 33 | 50 |
| 6. New Potter, 7 yrs | 34 | 30 | 12. Arthur, 6 yrs | 33 | 7 |

An average crop of 34 bushels 41 lbs. per acre.

## FIVE TO SEVEN YEARS' EXPERIENCE WITH VARIETIES OF INDIAN CORN.

The six varieties of Indian corn which have averaged the heaviest crops at the several experimental farms, during the past five to seven years, are the following. (Where not otherwise marked, the figures given are the results of seven years' tests) :—

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Cob Ensilage | 24 | 599 | 4. Cloud's Early Yellow, 5 yrs | 23 | 1,745 |
| 2. Rural Thoro'bred White Flint | 23 | 1,937 | 5. Selected Leaming, 6 yrs | 23 | 136 |
| 3. Giant Prolific Ensilage | 23 | 1,901 | 6. Champion White Pearl | 21 | 172 |

An average crop of 23 tons 748 lbs. per acre.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Rural Thoro'bred White Flint.... | 17 | 1,245 |
| 2. Red Cob Ensilage.. .. .. .. .. .. | 16 | 1,030 |
| 3. Selected Leaming, 6 yrs.. .. .. .. | 16 | 578 |
| 4. Sanford... .. .. .. .. .. .. .. .. | 15 | 1,801 |
| 5. Pride of the North... .. .. .. .. | 15 | 1,529 |
| 6. Angel of Midnight.... .. .. .. .. | 15 | 1,326 |

An average crop of 16 tons 585 lbs. per acre.

EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Rural Thoro'bred White Flint... | 21 | 1,635 |
| 2 Angel of Midnight.. .. .. .. .. .. | 20 | 986 |
| 3. Cloud's Early Yellow, 5 yrs.... .. | 19 | 1,020 |
| 4. Longfellow.. .. .. .. .. .. .. .. | 19 | 946 |
| 5. Red Cob Ensilage.. .. .. .. .... | 18 | 1,978 |
| 6. King of the Earliest, 6 yrs... .. | 18 | 1,517 |

An average crop of 19 tons 1,680 lbs. per acre.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Cloud's Early Yellow, 5 yrs... .. | 15 | 622 |
| 2. Early Butler, 5 yrs.... .. .. .. .. | 14 | 976 |
| 3. Giant Prolific Ensilage... .. .. .. | 13 | 1,842 |
| 4. Pride of the North... .. .. .. .. | 13 | 1,250 |
| 5. Selected Leaming, 6 yrs.... .. .. | 13 | 888 |
| 6. Mammoth 8-rowed Flint... .. .. | 13 | 139 |

An average crop of 13 tons 1,953 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Early Butler, 5 yrs.... .. .. .. .. | 24 | 780 |
| 2. Red Cob Ensilage.. .. .. .. .. .. | 23 | 1,652 |
| 3. Cloud's Early Yellow, 5 yrs... .. | 23 | 442 |
| 4. Selected Leaming, 6 yrs... .. .. | 21 | 1,942 |
| 5. King of the Earliest, 6 yrs.... .. | 20 | 1,575 |
| 6. Pride of the North... .. .. .. .. | 20 | 1,305 |

An average crop of 22 tons 949 lbs. per acre.

The six varieties of Indian corn which have produced the largest crops for the past five to seven years, taking the average of the results obtained on all the experimental farms, are :—

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Cloud's Early Yellow, 5 yrs... .. | 19 | 1,001 |
| 2. Red Cob Ensilage.. .. .. .. .. .. | 19 | 651 |
| 3. Rural Thoro'bred White Flint.... | 19 | 134 |
| 4. Selected Leaming, 6 yrs... .. .. | 18 | 1,210 |
| 5. Early Butler, 5 yrs... .. .. .. .. | 18 | 958 |
| 6. Giant Prolific Ensilage.. .. .. .. | 17 | 1,976 |

An average crop of 18 tons 1,655 lbs. per acre.

## FIVE AND SIX YEARS' EXPERIENCE WITH VARIETIES OF TURNIPS.

The six varieties of turnips which have averaged the heaviest crops at the several experimental farms, during the past five and six years, are the following. (Where not otherwise marked, the figures given are the results of six years' tests) :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1 Carter's Elephant.. .. .. .. .. .. | 36 | 317 | 4. Shamrock Purple Top, 5 yrs.... | 33 | 1,649 |
| 2. Selected Purple Top.. .. .. .. .. | 35 | 1,747 | 5. Hall's Westbury, 5 yrs.. .. .. .. | 33 | 33 |
| 3. Perfection Swede... .. .. .. .. | 33 | 1,790 | 6. Hartley's Bronze.. .. .. .. .. .. | 32 | 1,670 |

An average crop of 33 tons 1,856 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze... .. .. .. .. .. | 35 | 1,824 | 4. Carter's Elephant.... .. .. .. .. | 34 | 1,078 |
| 2. Halewood's Bronze Top, 5 yrs.... | 34 | 1,927 | 5. Shamrock Purple Top, 5 yrs.. .. | 33 | 1,779 |
| 3. Perfection Swede... .. .. .. .. .. | 34 | 1,569 | 6. Mammoth Clyde.. .. .. .. .. .. | 33 | 81 |

An average crop of 34 tons 1,043 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Hartley's Bronze... .. .. .. .. .. | 24 | 1,315 | 4. Selected Purple Top.... .. .. .. | 23 | 728 |
| 2. Hall's Westbury, 5 yrs.. .. .. .. | 23 | 1,137 | 5. Prize Winner.. .. .. .. .. .. .. | 23 | 557 |
| 3. Perfection Swede.. .. .. .. .. .. | 23 | 838 | 6. Skirvings.. .. .. .. .. .. .. .. .. | 22 | 1,452 |

An average crop of 23 tons 245 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Perfection Swede.. .. .. .. .. .. | 23 | 362 | 4. Hall's Westbury, 5 yrs.. .. .. .. | 22 | 298 |
| 2. Halewood's Bronze Top.. .. .. .. | 22 | 849 | 5. Hartley's Bronze.. .. .. .. .. .. | 21 | 430 |
| 3. Selected Purple Top.. .. .. .. .. | 22 | 771 | 6. Shamrock Purple Top, 5 yrs.. .. | 20 | 1,858 |

An average crop of 22 tons 95 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Bangholm Selected.... .. .. .. .. | 44 | 1,186 | 4. Hall's Westbury.. .. .. .. .. .. | 40 | 612 |
| 2. Halewood's Bronze Top, 5 yrs.... | 41 | 1,084 | 5. Perfection Swede.. .. .. .. .. .. | 40 | 450 |
| 3. Selected Purple Top.. .. .. .. .. | 41 | 197 | 6. Jumbo.. .. .. .. .. .. .. .. .. .. | 39 | 856 |

An average crop of 41 tons 564 lbs. per acre.

The six varieties of turnips which have averaged the heaviest crops at the several experimental farms, for the past five and six years, are :—

| | Per acre. Tons. | Lbs | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Purple Top Swede.. .. .. .. .. .. | 31 | 206 | 4. Hall's Westbury' 5 yrs.. .. .... | 30 | 579 |
| 2. Perfection Swede... .. .. .. .. .. | 31 | 202 | 5. Hartley's Bronze.. .. .. .. .. .. | 29 | 1,700 |
| 3. Halewood's Bronze Top, 5 yrs.... | 30 | 783 | 6. Bangholm Selected, 5 yrs.. .. .. | 29 | 1,648 |

An average crop of 30 tons 853 lbs. per acre.

## FIVE AND SIX YEARS' EXPERIENCE WITH VARIETIES OF MANGELS.

The six varieties of mangels which have averaged the heaviest crops at the several experimental farms, for the past five or six years, are the following. (Where not otherwise marked, the figures given are the results of six years' tests) :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Gate Post | 39 | 961 |
| 2. Giant Yellow Intermediate | 38 | 1,587 |
| 3. Mammoth Long Red | 36 | 1,920 |
| 4. Yellow Intermediate | 36 | 1,525 |
| 5. Giant Yellow Globe | 35 | 1,609 |
| 6. Giant Yellow Half Long, 5 yrs | 35 | 1,037 |

An average crop of 37 tons 440 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Giant Yellow Intermediate | 34 | 425 |
| 2. Yellow Intermediate | 32 | 1,505 |
| 3. Norbiton Giant | 32 | 420 |
| 4. Giant Yellow Globe | 32 | 283 |
| 5. Giant Yellow Half Long, 5 yrs | 32 | 278 |
| 6. Gate Post | 31 | 1,016 |

An average crop of 32 tons 1,088 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Selected Mamm. Long Red, 5 yrs. | 36 | 1,141 |
| 2. Yellow Intermediate | 34 | 423 |
| 3. Giant Yellow Intermediate | 33 | 1,638 |
| 4. Gate Post, 5 yrs | 32 | 1,548 |
| 5. Prize Mammoth Long Red | 32 | 1,516 |
| 6. Mammoth Long Red | 31 | 1,876 |

An average crop of 33 tons 1,357 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Selected Mamm. Long Red, 5 yrs. | 23 | 808 |
| 2. Giant Yellow Half Long, 5 yrs | 23 | 582 |
| 3. Yellow Intermediate, 5 yrs | 23 | 91 |
| 4. Champion Yellow Globe | 22 | 1,750 |
| 5. Gate Post | 22 | 939 |
| 6. Ward's Large Oval-shaped | 22 | 882 |

An average crop of 22 tons 1,842 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Yellow Intermediate, 5 yrs | 34 | 1,934 |
| 2. Giant Yellow Intermediate, 6 yrs. | 32 | 1,272 |
| 3. Selected Mamm. Long Red, 5 yrs. | 30 | 1,248 |
| 4. Giant Yellow Half Long, 5 yrs | 29 | 1,959 |
| 5. Gate Post, 6 yrs | 28 | 1,738 |
| 6. Mammoth Long Red, 5 yrs | 28 | 23 |

An average crop of 30 tons 1,696 lbs. per acre.

The six varieties of mangels which have produced the largest crops for the past five or six years, taking the average of the results obtained at all the experimental farms, are :—

| | Per acre. Tons. | Lbs. |
|---|---|---|
| 1. Yellow Intermediate | 32 | 696 |
| 2. Giant Yellow Intermediate | 32 | 254 |
| 3. Gate Post | 31 | 160 |
| 4. Selected Mammoth Long Red | 30 | 578 |
| 5. Mammoth Yellow Intermediate. | 29 | 1,841 |
| 6 Giant Yellow Half Long | 29 | 1,100 |

An average crop of 30 tons 1,771 lbs. per acre.

## FIVE AND SIX YEARS' EXPERIENCE WITH VARIETIES OF CARROTS.

The six varieties of carrots which have produced the heaviest crops at the several experimental farms, for the past five or six years, are the following. (Where not otherwise marked, the figures given are the results of six years' tests) :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant White Vosges... .. .. .. .. | 30 | 1,193 | 4. Improved Short White.. .. .. .. | 29 | 373 |
| 2. Mammoth White Intermediate. .. | 29 | 1,675 | 5. Iverson's Champion.. .. .. .. .. | 29 | 300 |
| 3. Half Long White... .. .. .. .. .. | 29 | 556 | 6. Green Top White Orthe, 5 yrs.. | 27 | 21 |

An average crop of 29 tons 353 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Mammoth White Intermediate... | 22 | 640 | 4. Green Top White Orthe... .. .. | 20 | 1,773 |
| 2. Giant White Vosges... .. .. .. .. | 21 | 1,385 | 5. Improved Short White.. .. .. .. | 20 | 902 |
| 3. Half Long White... .. .. .. .. .. | 21 | 1,303 | 6. Iverson's Champion.. .. .. .. .. | 19 | 650 |

An average crop of 20 tons 1,442 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Giant White Vosges... .. .. .. .. | 14 | 563 | 4. Mamm. White Intermediate, 5 yrs. | 13 | 418 |
| 2 Half Long White... .. .. .. .. .. | 14 | 270 | 5. Early Gem.... .. .. .. .. .. .. .. | 12 | 1,410 |
| 3. Iverson's Champion... .. .. .. .. | 13 | 473 | 6. White Belgian... .. .. .. .. .. .. | 12 | 1,080 |

An average crop of 13 tons 702 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White, 5 yrs.. .. | 11 | 1,353 | 4. Mamm. White Intermediate, 5 yrs. | 10 | 942 |
| 2. Half Long White, 5 yrs.. .. .. .. | 11 | 1,153 | 5. Green Top White Orthe, 5 yrs.... | 10 | 594 |
| 3. Iverson's Champion, 5 yrs.. .. .. | 11 | 584 | 6. White Belgian... .. .. .. .. .. .. | 10 | 354 |

An average crop of 10 tons 1,830 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Improved Short White... .. .. .. | 33 | 1,087 | 4. Green Top White Orthe... .. .. | 29 | 1,462 |
| 2. Giant White Vosges.. .. .. .. .. | 31 | 1,664 | 5. Yellow Intermediate.... .. .. .. | 28 | 1,448 |
| 3. Half Long White... .. .. .. .. .. | 31 | 968 | 6. Iverson's Champion.. .. .. .. .. | 28 | 999 |

An average crop of 30 tons 1,271 lbs. per acre.

The six varieties of carrots which have produced the largest crops during the past five or six years, taking the average of the results obtained on all the experimental farms, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Half Long White... .. .. .. .. .. | 21 | 1,250 | 4. Mammoth White Intermediate... | 20 | 1,705 |
| 2. Giant White Vosges... .. .. .. .. | 21 | 1,245 | 5. Iverson's Champion.. .. .. .. .. | 20 | 601 |
| 3. Improved Short White... .. .. .. | 21 | 637 | 6. Green Top White Orthe... .. .. | 19 | 1,601 |

An average crop of 20 tons 1,840 lbs. per acre.

# FOUR AND FIVE YEARS' EXPERIENCE WITH VARIETIES OF SUGAR BEETS.

The four varieties of sugar beets which have averaged the heaviest crops at the several experimental farms, for the past four or five years, are the following :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Improved... .. .. .. .. .. | 26 | 1,735 | 3. Wanzleben... .. .. .. .. .. .. .. | 25 | 1,496 |
| 2. Improved Imperial.... .. .. .. .. | 26 | 968 | 4. Danish Red Top... .. .. .. .. .. | 25 | 284 |

An average crop of 26 tons 40 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Red Top Sugar.. .. .. .. .. .. .. | 27 | 950 | 3. Improved Imperial... .. .. .. .. | 26 | 402 |
| 2. Danish Red Top.. .. .. .. .. .. .. | 26 | 487 | 4. Danish Improved.. .. .. .. .. .. | 23 | 575 |

An average crop of 25 tons 1,613 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top.. .. .. .. .. .. .. | 31 | 1,013 | 3. Red Top Sugar.... .. .. .. .. .. | 25 | 426 |
| 2. Danish Improved... .. .. .. .. .. | 26 | 1,077 | 4. Wanzleben... .. .. .. .. .. .. .. | 25 | 93 |

An average crop of 27 tons 152 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top.... .. .. .. .. .. | 19 | 225 | 3. Improved Imperial... .. .. .. .. | 15 | 1,270 |
| 2. Red Top Sugar.. .. .. .. .. .. .. | 16 | 1,446 | 4. Wanzleben... .. .. .. .. .. .. .. | 15 | 789 |

An average crop of 16 tons 1,432 lbs. per acre.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top, 3 yrs... .. .. .. | 28 | 1,222 | 3. Red Top Sugar.... .. .. .. .. .. | 21 | 536 |
| 2. Improved Imperial.... .. .. .. .. | 22 | 528 | 4. Vilmorin's Improved.... .. .. .. | 20 | 1,696 |

An average crop of 23 tons 495 lbs. per acre.

The four varieties of sugar beets which have produced the largest crops during the past four or five years, taking the average of the results obtained at all the experimental farms, are :—

| | Per acre. Tons. | Lbs. | | Per acre. Tons. | Lbs. |
|---|---|---|---|---|---|
| 1. Danish Red Top.. .. .. .. .. .. .. | 26 | 246 | 3. Danish Improved.. .. .. .. .. .. | 22 | 1,091 |
| 2. Red Top Sugar.. .. .. .. .. .. .. | 23 | 172 | 4. Improved Imperial... .. .. .. .. | 22 | 792 |

An average crop of 23 tons 1,075 lbs. per acre.

## FIVE TO SEVEN YEARS' EXPERIENCE WITH VARIETIES OF POTATOES.

The twelve varieties of potatoes which have averaged the heaviest crops at the several experimental farms, during the past five to seven years, are the following. (Where not otherwise marked, the figures given are the results of seven years' tests) :—

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| Variety | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Holborn Abundance | 424 | 51 |
| 2. Seattle | 422 | 59 |
| 3. American Wonder | 418 | 8 |
| 4. Late Puritan | 406 | 1 |
| 5. Seedling, No. 230 | 388 | 8 |
| 6. Burnaby Seedling | 381 | 48 |
| 7. Dreer's Standard | 373 | 34 |
| 8. Everett | 373 | 2 |
| 9. State of Maine | 369 | 50 |
| 10. Polaris | 368 | 59 |
| 11. Vanier | 368 | 30 |
| 12. Empire State | 368 | 15 |

An average crop of 388 bushels 40 lbs. per acre.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES, NAPPAN, N.S.

| Variety | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Seedling, No. 30, 6 yrs | 436 | 8 |
| 2. Irish Daisy | 431 | 4 |
| 3. Holborn Abundance | 422 | 49 |
| 4. Seattle, 6 yrs | 410 | 3 |
| 5. American Giant, 5 yrs | 401 | 58 |
| 6. Hale's Champion, 6 yrs | 389 | 39 |
| 7. Pearce's Prize Winner, 6 yrs | 384 | 24 |
| 8. Pride of the Market | 384 | .. |
| 9. Carman, No. 1 | 383 | 19 |
| 10. Vanier, 6 yrs | 374 | 33 |
| 11. Dreer's Standard | 366 | 18 |
| 12. Great Divide | 365 | 59 |

An average crop of 395 bushels 51 lbs. per acre.

### EXPERIMENTAL FARM FOR MANITOBA, BRANDON, MAN.

| Variety | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. Carman, No. 1 | 394 | 57 |
| 2. Irish Daisy, 6 yrs | 394 | 10 |
| 3. State of Maine | 389 | 27 |
| 4. Delaware, 6 yrs | 388 | 40 |
| 5. American Wonder, 5 yrs | 387 | 11 |
| 6. Dreer's Standard | 383 | 57 |
| 7. Clarke's No. 1 | 379 | 46 |
| 8. Late Puritan | 379 | 14 |
| 9. Great Divide | 372 | 57 |
| 10. Early Norther, 6 yrs | 365 | 10 |
| 11. New Variety, No. 1 | 363 | 37 |
| 12. Pearce's Prize Winner, 6 yrs | 363 | 37 |

An average crop of 380 bushels 14 lbs. per acre.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES, INDIAN HEAD, N.W.T.

| Variety | Per acre. Bush. | Lbs. |
|---|---|---|
| 1. American Giant, 6 yrs | 494 | 50 |
| 2. American Wonder | 458 | 6 |
| 3. New Variety, No. 1, 6 yrs | 436 | 4 |
| 4 General Gordon, 5 yrs | 431 | 24 |
| 5. Rochester Rose, 6 yrs | 430 | 59 |
| 6. Northern Spy | 415 | 44 |
| 7. Lee's Favourite, 6 yrs | 415 | 21 |
| 8. Carman, No. 1 | 408 | 51 |
| 9. Seedling, No. 230 | 406 | 33 |
| 10. Lizzie's Pride | 405 | 20 |
| 11. State of Maine | 404 | 42 |
| 12. Green Mountain | 404 | 41 |

An average crop of 426 bushels 3 lbs. per acre.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA, AGASSIZ, B.C.

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1. Rose, No. 9, 5 yrs.. .. .. .. .. .. | 424 | .. | 7. Vick's Extra Early... .. .. .. .. | 389 | 10 |
| 2. Dakota Red... .. .. .. .. .. .. .. | 404 | 48 | 8. Houlton Rose... .. .. .. .. .. .. | 385 | 55 |
| 3. Seedling, No. 7.. .. .. .. .. .. .. | 402 | 21 | 9. Clay Rose.. .. .. .. .. .. .. .. | 385 | 3 |
| 4. Seedling, No. 230... .. .. .. .. .. | 398 | 4 | 10. Bill Nye, 5 yrs.... .. .. .. .. .. | 374 | 43 |
| 5. Carman, No. 3... .. .. .. .. .. .. | 391 | 1 | 11. Reeve's Rose, 5 yrs.. .. .. .. .. | 373 | 29 |
| 6. Brown's Rot Proof.... .. .. .. .. | 390 | 15 | 12. Irish Daisy.. .. .. .. .. .. .. .. | 366 | 25 |

An average crop of 390 bushels 26 lbs. per acre.

The twelve varieties of potatoes which have produced the largest crops, taking the average of the results obtained on all the experimental farms for the past five to seven years, are :—

| | Per acre. Bush. | Lbs. | | Per acre. Bush. | Lbs. |
|---|---|---|---|---|---|
| 1 Seedling, No. 230... .. .. .. .. .. | 391 | 43 | 7. Late Puritan... .. .. .. .. .. .. | 369 | 14 |
| 2. Everett.... .. .. .. .. .. .. .. .. | 390 | 41 | 8. Carman, No. 1... .. .. .. .. .... | 367 | 22 |
| 3. Seedling, No. 7, 5 yrs.... .. .. .. | 386 | 26 | 9. Carman, No. 3, 5 yrs.... .. .. .. | 366 | 40 |
| 4. Irish Daisy... .. .. .. .. .. .. .. | 384 | 56 | 10. Rose, No. 9, 5 yrs.... .. .. .. .. | 366 | 33 |
| 5. American Wonder.. .. .. .. .. .. | 384 | 6 | 11. Seattle.... .. .. .. .. .. .. .. .. | 364 | 43 |
| 6. American Giant.... .. .. .. .. .. | 383 | 17 | 12. Empire State... .. .. .. .. .. .. | 363 | 11 |

An average crop of 376 bushels 34 lbs. per acre.

## SUMMARY.

The results of the testing of varieties for another year strengthens the conclusions reached in the past as to the importance of chosing the best and most productive sorts for seed if we are to realize the largest crops. Further experience also confirms the view that there are marked and fairly constant differences in the productiveness of varieties grown side by side, under similar conditions. A few points in support of this will be cited.

Of the 41 different sorts of oats which have now been under trial for six or seven years at all the Dominion experimental farms, only 18 of these have at any time appeared in the list of the best twelve. Hence many of the same varieties appear every year in the productive list. The average crop given by these 12 best sorts for the past six or seven years has been 72 bushels 24 lbs. per acre, while the remaining 29 varieties have averaged during the same time 66 bushels 2 lbs., a difference in favour of the most productive sorts of 6 bushels 22 lbs. per acre. This receives additional significance when we recall the fact that every bushel of oats added to the average crop of the Dominion puts about one million dollars into the pockets of Canadian farmers.

In barley this constancy in productiveness is even more marked. Of the 30 different sorts which have been under trial for the past six and seven years, 10 of these have appeared in the best 12 every year for the whole period and 14 only have found their way during this time into the list of the best twelve. While the 12 most productive sorts have given an average crop for the whole period of 45 bushels 30 lbs. per acre, the remaining 22 sorts have averaged for the same period 41 bushels 45 lbs., or nearly four bushels less per acre.

In the returns for the trial plots of spring wheat similar evidence is found. Of the 31 varieties of this cereal which have been tested for six or seven consecutive years, 8 of these have appeared among the most productive every year for the whole period. Comparing the best twelve varieties for 1899 with the best twelve for 1900, we find that eleven of them are the same, and comparing the best twelve for 1900 with that for 1901, we find the lists exactly the same.

Similar evidence could be furnished from the trial plots of all the other crops, but enough has been brought forward to show that the opinions advanced are well founded. Should it become a general practice among farmers to choose for sowing those varieties which have been shown to be most productive and give them reasonably fair cultivation, there is no doubt that this would result in a material increase in the average crops of the country and thus make farming increasingly profitable.